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ORIGINAL ARTICLES.

PAGE

Affleck, J. O., and Welsh, D. A., Observations on a Case of Intermittent Fever (one figure and two charts in text) 105

Ambler, John R., Atheroma of the Aorta 537

Bain, William, The Relative Excretion of the Nitrogenous Waste Products in a Case of Liver Abscess 334

Balfour, Andrew, and Porter, Charles, The Bacteriology of Typhus Fever. (Plate XIV.) 522

Barling, Gilbert, Appendicitis: The Results of Operation in 117 Cases, with some Considerations on the Questions of Diagnosis, of Recurrence, and of Mortality 493

Bayliss, R. A., Acute Rheumatoid Arthritis 160

Beatson, George Thomas, Observations on the Existence of Enzymes in Cancerous Growths 393

Bell, W. Blair, Spasmodic Asthma 339

Bishop, E. Stanmore, Three Cases of Ureteral Calculi impacted in the Lower End of the Ureter, and Removed by Suprapubic Cystotomy (three figures in text) 47

Brown, A. Crum, Dr. John Mayow: The Harveian Oration for 1899 . 116

Brunton, T. Lauder, Jaundice in Some of its Aspects 309

Bunch, J. L., On Mouth Breathing 57

Campbell, H. J., Pulmonary Tuberculosis in Young Children . . 259

Carter, Godfrey, The Etiology of Graves's Disease 343

Cave, Edward J., Some Recent Appplications of Bacteriology to Clinical Medicine 148

Edgar, John, and Teacher, John H., Repeated Ectopic Gestation in the same Patient 34

Fenwick, E. Hurry, Primary Malignant Disease of the Prostate Gland: A Clinical Study of the First Fifty Cases which have been under the Writer's Care and Observation (four figures in the text) . . . 16

PAGE

FENWICK, E. HURRY, The Plastic Repair of Urethro-Perineo-Scrotal Fistulæ (five figures in text) 419

FERGUSON, JAMES HAIG, Observations on Labour, Complicated by a Minor Degree of Pelvic Contraction in Primiparæ and Multiparæ . . 41

FISHER, THEODORE, Some Points of Interest in the Morbid Anatomy of the Aortic Valve. (Plates V. and VI.) 414

GIBSON, G. A., Acromegaly. (Plates VII.-XIII.) 505

GIBSON, G. A., Principles of Reflex Action (two figures in text) . . 318

HAILES, CLEMENTS D. G., The Clinical Aspect of Iritis 326

HYDE, SAMUEL, The Hot Air Treatment of Disease 421

JONES, R. LLEWELYN, and CLINCH, T. ALDOUS, Palpation of the Pancreas in Splanchnoptosis (Glénard's Disease) 432

KELYNACK, T. N., The Pathology of Renal Tumours 233

KIRKLAND, R., Infective Endocarditis. Remarks with Illustrative Cases . 251

LANE, W. ARBUTHNOT, Some Points in the Mechanics of the Skeleton. (Plates I.-IV.) 209

LITTLEJOHN, HARVEY, Medico-Legal Notes 222

LITTLEJOHN, HARVEY, and KER, CLAUDE B., An Outbreak of Typhus Fever (four charts in text) 23

M'BRIDE, P., Asthma in relation to the Upper Air Passages . . 7

MACGREGOR, G. SCOTT, Cases Illustrative of Syphilitic Meningo-Myelitis . 242

MACKENNA, ROBERT WILLIAM, Bacillus Typhosus and Bacillus Coli Communis: A Critical Comparison, with some Description of a New Method for the Differentiation, and its Application to the Diagnosis of Typhoid Fever 399

MACLACHLAN, JOHN T., Erysipelas and Allied Diseases 129

MORISON, RUTHERFORD, Pyloroplasty (five figures in text) 140

RAMSAY, A. MAITLAND, Strumous Ophthalmia 1

ROBSON, A. W. MAYO, The Relation of Typhoid Fever to Diseases of the Gall Bladder, with a Reference to the Bacterial Origin of Gall Stones (one figure in text) 218

WARDEN, A. A., Partial Retention of Urine: Its Consequences and Treatment 53

YEO, I. BURNEY, On Cardiac Strain in Adolescence and in Middle Age . 11

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ORIGINAL COMMUNICATIONS.

STRUMOUS OPHTHALMIA.[1]

By A. MAITLAND RAMSAY, M.D., *Ophthalmic Surgeon, Glasgow Royal Infirmary; Lecturer on Eye Diseases, Queen Margaret College, University of Glasgow.*

STRUMOUS OPHTHALMIA is used as a convenient name under which to group a large number of cases of inflammation of the conjunctiva characterised by the presence of one or more white-topped papules. The disease is known also as phlyctenular or pustular conjunctivitis, eczema of the conjunctiva, conjunctivitis lymphatica, or, from the frequency with which the cornea is involved, phlyctenular keratitis.

It is essentially a children's disease, for in adults it is almost never seen except in those who have suffered from it in their early years. It sometimes appears during the period of dentition, and is most frequent during the first decade of life. It attacks girls oftener than boys, and in them occasionally comes on for the first time just before menstruation is established. Both eyes are usually affected, one in that case much more severely than the other; and as relapse is very apt to occur, a case may last for many months. Though strumous ophthalmia occurs in children of all classes, it is naturally much more common among the poor, and especially among those who from their earliest infancy have been improperly fed and scantily clothed; at one time unduly exposed to the vicissitudes of the weather, and at another confined in small and badly ventilated rooms. It frequently follows one or other of the exanthemata, more particularly measles.

Photophobia is one of the most characteristic and most distressing symptoms. The child generally sits on its mother's lap with its face pressed closely against her body, and every attempt at examination is met by struggles and screams, entreaties to have the light kept off, and efforts to shield the eyes with hands and arms. After the hands have been drawn away, the eyelids are kept tightly pressed together, and their separation is most strenuously resisted. When at length they are partly opened, there is a gush of tears, and a violent fit of sneezing expels muco-purulent discharge from the nostrils.

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[1] A Clinical Lecture delivered at Queen Margaret College on 31st May 1899.

If the disease has existed for a lengthened period, the eyelids, nose, and upper lip are markedly swollen, and in all probability the face is covered by an eczematous eruption. The excoriation of the skin leads to the formation at the outer canthus of a fissure, which, on any rough separation of the lids, bleeds and causes a great deal of pain. When after much trouble the balls are at last exposed, one is often surprised to find how slight the local lesions really are. Even when photophobia is very distressing, and when the upper eyelids are swollen and their surface marbled by large congested veins, there may be hardly a trace of redness over the sclerotic. In most cases, however, there are localised congestions, and the ocular conjunctiva is traversed by a leash of blood vessels running towards a minute phlycten, situated on the surface of the cornea, often right over the centre of the pupil, which, as a result of the irritation of the corneal nerves, is always greatly contracted.

The phlycten is the most characteristic objective feature of this disease. It may be of large size and solitary, or there may be a group of small pustules, but in either case the situation is on the surface of the globe, for the most part on the limbus corneæ. These pustular elevations vary greatly in size, are of a yellowish grey colour, and in most instances disappear after a few days, leaving no trace. At other times, however, their appearance marks the beginning of ulceration of the cornea. Up to this stage there has been no real pain, except when the eyes have been exposed to light. There is no complaint if the patient be only left alone in a dark corner of a room, or with the face buried in a pillow; but whenever ulceration begins there is more or less active suffering, and pain is very apt to come on violently during the night, and cause the child to start up screaming from its sleep. Such ulcers are always slow in healing, and at times, even after the surrounding infiltration has all cleared up, there remains a transparent dimple which may not disappear for weeks or even months. Sometimes a leash of newly developed blood vessels spreads from the corneo-scleral margin to the ulcer, which then, becoming vascular, appears as a red speck, which may persist for a long time. Occasionally the greater part of the cornea becomes vascular—pannus scrofulosus. In unhealthy children these phlyctenular ulcers are prone to suppurate, and then pus collects between the layers of the cornea, and accumulates in the anterior chamber. In these severe cases perforation is apt to occur, and to be followed by a prolapse of iris so large that the eyeball is irretrievably damaged — a condition that may give rise to sympathetic inflammation of the other eye.

Although there is, in a typical case of strumous ophthalmia, always profuse lachrymation, there is no sticky muco-purulent discharge, unless the inflammation has spread from the bulbar to the palpebral conjunctiva. Whenever that occurs catarrhal symptoms are present, and the whole conjunctiva becomes injected. In most cases there is also injection of the lymphatics.

Ophthalmia may be the earliest indication of a strumous diathesis, and in cases where the conjunctival lesions are slight, severe subjective phenomena may arise from a source of irritation elsewhere than in the eye, *e.g.* in the stomach or bowels. It is by no means unusual for the conjunctivitis to alternate with suppuration of the middle ear, or with eczematous eruptions on the head or other parts of the body. Nutrition is seriously interfered with, and the coated tongue studded with large red papillæ shows the irritable condition of the mucous membrane of the whole intestinal tract. There is sometimes a constant craving for food, and almost invariably more is eaten than can be digested; fermentation results, the belly is distended, and the alvine secretions have an offensive smell and an unnatural appearance. The urine is high-coloured, deposits urates, and often contains traces of sugar. The skin is pale and rough, the flesh hangs loosely on the bones, the hands and feet readily become cold, and the head perspires freely, and often swarms with pediculi. The joints, both large and small, are very frequently destroyed by tubercular inflammation of their synovial membrane and caries and necrosis of the bones. Severe ectropion—causing hideous disfigurement—will arise if the bone necrosis occur in the neighbourhood of the orbit; and indelible scars invariably result if there be suppuration of the lymphatic glands in the neck or elsewhere.

Owing to the intense blepharospasm, it is always a difficult matter to examine the eyes of children suffering from strumous ophthalmia. Every care ought to be taken not to hurt the child unnecessarily, and its eyes may be best examined by placing the head between the surgeon's knees while the nurse holds the arms against the body. After cocaine has been instilled, it is easy to depress the lower and raise the upper lid gently by means of retractors, but, as the child persists in rolling the eyes upwards, it is often difficult to obtain a good view of the cornea. The condition of the cornea must, however, be accurately determined before any treatment is begun, and in very bad cases it may be necessary, before making the first examination, to administer a general anæsthetic.

The treatment of strumous ophthalmia must be constitutional as well as local. It is necessary always to bear in mind that the very essence of the disease lies in the mal-assimilation of food, and that most, if not all, cases arise as a result of improper dieting. You may be told that the child eats very sparingly, and that may be quite true as far as the regular meals are concerned; but by careful inquiry you will usually discover that the small appetite at the proper times for eating generally arises from the patient's having been, in response to cries for "a piece," supplied liberally between meals with bread and butter, sweets, fruits, or any other eatable which may have chanced to be at hand. Instead, therefore, of eating too little, these children eat too much; and although they may appear ill-nourished, the mal-nutrition is due to mal-assimilation rather than to insufficiency of food. The first thing to be done, therefore, in treating a case of strumous ophthalmia, is to give particular directions regarding the diet. The child must not be allowed to eat whenever it cries for food, but ought to be fed at regular intervals; nor must it get what is among the poor popularly called "the run of the house," but should have meals specially prepared, and in quantity and quality of such a kind as not to overtax the powers of digestion. Sugar in every shape and form, fruits, pastries, potatoes, etc., must be rigidly excluded from the dietary, and it is usually advisable to confine the patient wholly to milk and water for the first forty-eight hours of the treatment, and then to add gradually meat-soups, eggs, fish, fowl, rice, etc., as the tongue becomes clean. Simultaneously with the cleaning of the tongue the intolerance of light begins to pass off, and the child opens its eyes, and interests itself in its surroundings. The fretfulness and unnatural irritability both become less, and the necessary treatment is, in consequence, much more willingly submitted to.

In addition to the careful supervision of diet, the free elimination of the toxins, which, as a result of mal-assimilation, have accumulated in the blood, must in every way be promoted. This is to be accomplished by stimulating the action of the kidneys, the bowels, and the skin—more especially the last. Hence the importance of the hot bath, which the child should have every night at bedtime, diaphoresis being further encouraged by the wearing of a warm flannel nightgown. It is usually advisable first of all to administer a dose of castor-oil; but it should be borne in mind that many of these children do not bear purgatives well, as the intestinal mucous membrane is so irritable that troublesome diarrhœa is easily induced.

Of drugs, none is so useful as tartar emetic, which should be given in slightly nauseating doses. Its chief virtue depends on its diaphoretic action, and its efficacy is greatly increased when it is administered with a laxative, *e.g.* powdered rhubarb. If the tongue be brown, a few grains of grey powder may be added, with advantage, to the rhubarb and antimony combination. Under this treatment it is wonderful how soon the whole appearance of the patient changes. As the power of digestion becomes greater, the skin improves in colour, the hands and feet keep warmer; and the child, instead of lying with its face buried in a pillow, and fretting and crying when spoken to, is now quite good-tempered, and runs about the ward and amuses itself with its playthings. Any indiscretion in diet will, however, promptly bring on a relapse, for in these cases the conjunctiva reflects the condition of the gastro-intestinal mucous membrane even more quickly than the tongue. Intolerance of light, blepharospasm, and increased lachrymation speedily show themselves after some forbidden food has been eaten, while the tongue may not become furred till the second or even the third day. The fear of relapse makes it imperative, therefore, that the treatment be continued for at least a fortnight after the recovery seems complete. Apart from simple digestive agents, such as pepsin, pancreatin, etc., no medicines are, as a rule, necessary, but most of the patients are benefited by quinine, which, either alone, or in combination with an acid, seems to exercise a favourable influence after the acute symptoms have subsided. Cod-liver oil, compound syrup of the phosphates, syrup of the iodide of iron, etc., are also very valuable remedies, but they should never be prescribed in the early stages, for they then simply add to the difficulties by still further overtaxing the digestive powers. When, however, all feverishness has disappeared, and the tongue is clean, they are decidedly helpful in improving the general nutrition, and promoting the repair of any local lesions in the eyes themselves. All syrups, however, such as chemical food, etc., must be used with great caution, lest they disturb digestion, and so determine a relapse. Dusart's syrup of the lacto-phosphate of lime and iron is the most easily assimilated; but, as a general rule, preparations in which sugar is replaced by glycerine or malt extract are safer. When there is much enlargement of the glands, a mixture of chloride of calcium and iron is very serviceable.

For the first few days of the treatment the patient should be kept in bed, with the eyes shaded from the light; but the use of all poultices and bandages must be strictly prohibited. Whenever improvement begins, the child ought to be encouraged to run about, and, if possible, sent to the country, preferably to a high, dry, bracing locality, and it should live out of doors as much as the weather will permit. The sea-coast should be avoided, as the glare from the water is apt to prove irritating to the eyes, and to cause a relapse.

The local treatment will necessarily vary according to the stage of the disease. The child's face and hands must be washed frequently, and, as far as possible, it ought to be prevented from crying and rubbing its eyes. The eyes themselves should be bathed night and morning—oftener if there be much discharge—with a warm solution of boracic acid, or a lotion containing perchloride of mercury and belladonna. While the symptoms of acute irritation last, atropine and cocaine, by soothing the nerves of the conjunctiva, and diminishing the congestion of its blood vessels, lessen the photophobia. Whenever the pupil dilates, the child usually opens its eyes; but when the superficial irritation is great, the action of the atropine persists only for a few hours, and, in order to obtain full benefit, the drug ought to be re-instilled whenever the pupil begins to contract. As the blepharospasm lessens, the cocaine may be omitted from the ointment, and the atropine combined with boracic acid or the red oxide of mercury. Even in cases which have lasted for a long time, leeches or blisters should not be used.

After the acute inflammatory symptoms have somewhat subsided, more stimulating applications are necessary, and calomel and the yellow oxide of mercury are the two favourite remedies at this stage. The former is most serviceable in relieving passive congestions. It must be dried thoroughly, and flicked from a camel-hair brush into the conjunctival sac. Its beneficial action seems due to the fact that the calomel becomes, by the action of the tears, converted into perchloride of mercury. It is therefore necessary to be careful not to use it too freely, or in too coarse powder, for any excess collects in the lower retrotarsal fold, upon which it is apt to have a caustic action. The yellow oxide of mercury often acts like a charm in cases where there is an efflorescence of pustules upon the bulbar conjunctiva. It is best applied in the form of an ointment of the strength of 1 or 2 gr. of the oxide to a drachm of white vaseline. The bulk of a barley-corn of this is instilled into the conjunctival sac, and the eye gently massaged for a few minutes through the closed eyelids.

In an ordinary case of strumous ophthalmia no further treatment than that just indicated is required. If a case is not making satisfactory progress, careful inquiry should at once be made as to whether the prescribed diet is being strictly attended to, as well as the nightly warm bath.

When the disease has been neglected, complications arise which require special remedies.

1. *Swelling of the eyelids, and muco-purulent discharge.*—The eyes must be kept scrupulously clean by bathing with an antiseptic lotion; and once a day, or oftener, according to the amount of the discharge, the conjunctival surface of the lids should be everted, and painted with a 2 per cent. solution of nitrate of silver. The presence of a fissure at the external canthus, when such treatment requires to be carried out, adds greatly to the child's sufferings; but as this fissure will never heal until the eyes can be opened voluntarily, there is no help for it but to persevere, every care, of course, being taken not to cause unnecessary pain.

2. *Inflammation of nasal mucous membrane.*—This membrane is swollen and ulcerated, and secretes a discharge so acrid that its

presence produces much swelling of the alæ nasi and the upper lip. If the child be permitted to lie with its face buried in a pillow, an eczematous eruption is sure to appear. The nostrils must be kept clean by douching with an alkaline antiseptic lotion, and the nasal mucous membrane brushed afterwards with ointment, *e.g.* a combination of iodol and tannic acid. As in these cases there is always an excess of acidity, alkalis are most serviceable. They should be given in small doses frequently repeated, and there is nothing better than a mixture of calcined magnesia and sulphur, or a combination of sulphate of magnesia with bicarbonate of soda.

3. *Pediculi.*—In neglected cases this is a very troublesome complication, and one regarding which the nurses must always be warned to be on their guard. In the most filthy cases it is necessary to cut the hair short, and in all the head must be washed with carbolic soap, well dried, and Stavesacre ointment rubbed into the roots of the hair. By this means the pediculi themselves are destroyed; but the nits remain firmly attached to the hairs, so that, after the first thorough dressing, scrupulous cleanliness and daily use of a small-tooth comb are necessary in order to prevent the vermin from re-accumulating.

4. *Ulceration of the cornea.*—In every case of strumous ophthalmia which has lasted for a long time, the cornea is almost certain to suffer, and whenever ulceration occurs the ulcer becomes the prominent feature, and all treatment is directed towards its cure. So important, indeed, is this phase of the subject, that a future lecture will be devoted to its discussion.

ASTHMA IN RELATION TO THE UPPER AIR PASSAGES.[1]

By P. M'Bride, M.D., F.R.C.P.Ed., F.R.S.E., *Surgeon, Ear and Throat Department, Royal Infirmary; Lecturer on Diseases of the Ear and Throat, Edinburgh University.*

In addressing an audience of specialists, it would be out of place—it would almost be an impertinence—to consider the relation of asthma to the upper air passages from an historical point of view. The names of Voltolini, Hack, B. Fränkel, and many others will at once occur to you all, as pioneers whose teachings have been of great value in calling attention to a connection which is admitted by all thoughtful physicians and specialists of to-day. Again, it would be equally out of place to ask you to follow me through the immense mass of literature which relates to reflex neuroses, of which asthma is probably the most important. This literature is in its main facts, no doubt, familiar to all here. As you are aware, it is abnormal conditions of the nose which have been most generally found to cause asthma, and it has seemed to me, therefore, best to begin my remarks with the heading:—

---

[1] Introduction of discussion of Asthma, etc., read before the Laryngological Society of London, May 1899.

Nasal asthma.—The most generally known form is, undoubtedly, the variety which occurs in the course of hay fever and allied conditions. You are all familiar with the chain of events in these cases—the symptoms of coryza induced by the pollen of grasses and flowers, dust, and the like, or more rarely by emanations from animals, chemicals, and a variety of other causes, followed in certain persons by asthma, which differs in no respect from the affection as commonly described in our medical textbooks. In this chain of events we have an illustration of nasal asthma in its most familiar form, and it is generally admitted that hay fever requires for its development a neurasthenic or at least a neurotic condition which acts as a predisposing cause. Of course you are all aware that in a proportion of cases we find more or less marked abnormalities in the nasal passages, but I am quite sure that in a very large number of instances these parts are, excepting during the attacks, for all practical purposes normal.

I take it that what takes place is as follows:—The specific irritant touches the mucous membrane, which, in order that the other phenomena may result, must be hyperæsthetic; erectile swelling then occurs, followed by hypersecretion. In certain persons a reflex asthma is set up by the nasal irritation. It is well known that hay fever is to some extent dependent upon race—thus Anglo-Saxons are more prone to be affected than persons of other nationalities. It seems also to be influenced very materially by social position, for I presume that most of us have observed it either chiefly or entirely among the better, or shall I say wealthier classes. Speaking for myself, I have seen numerous cases, but with one or two exceptions they have always occurred in private patients.

A less common but still a relatively common form of nasal asthma is that which seems to depend upon the presence of nasal polypi. In these cases the nostrils are usually not completely occluded, so that the presence of the growths may escape observation unless attention be directed to this point. I have now seen a considerable number of people who suffered from asthma, and in whom nasal polypi existed. Where this combination occurs, I consider that we may very reasonably expect to benefit the former by removal of the latter. It is somewhat difficult to explain why small polypi should be more liable to cause asthma than large growths, but probably the former being more mobile are for this reason more likely to irritate the mucous membrane.

In certain cases of hypertrophic catarrh and deviations or outgrowths from the septum, we also meet with asthma which may be benefited by local treatment. Sometimes the pathological condition is obvious and so marked as to interfere with nasal respiration, and thus give rise to local discomfort. There can then be no great difficulty in determining upon the proper line of treatment. In other instances, however, deviations from the normal are slight—so slight that perhaps we should not be justified in calling them pathological. Gentlemen, I know I am treading on thin ice when I say that we have as yet no satisfactory definition of a normal nose. We know very well what the anatomically correct organ should look like: the nasal septum should be straight and have no outgrowth; the middle and inferior turbinated bodies should be of a certain size, shape, and colour. This is the ideal, but we rarely find it, just as it is uncommon to find perfection elsewhere in this world. I have introduced this matter in order to lead up to the fact that we are often called upon to make rhinoscopic examinations of asthmatics, and frequently find nothing which, if discovered in another person, we should be justified in stigmatising as pathological. I think I may say without offence that rhinologists all over the world are divided into two classes. One holds that it is most desirable for a man's nose to be symmetrical, not only externally, which we all admit, but also internally. Gentlemen of this persuasion make it their business to straighten every septum which is not mathematically straight, to remove any excrescences which they find disagreeable to the examining eye, and finally to reduce the turbinated bodies to such size as seems proper to them. Those who belong to the opposite camp tend to limit treatment to cases in which the condition of the nose is such as to produce nasal symptoms, appreciable as nasal by the patient. I fancy that most of us here hold with the second class, and I need hardly say that my own views are decidedly conservative with regard to nasal surgery. At the same time, if these conservative views in their entirety be brought to bear upon nasal asthma, they may prove misleading; and, moreover, if your patient falls into the hands of a nasal specialist who believes no nose normal, he may effect a cure where you have failed.

I do not wish to say that I have met with nasal asthma in an absolutely normal nose, but it appears to me that in some asthmatics nasal treatment is permissible and even desirable, where the conditions are such that on other grounds operative measures would certainly not be indicated. Thus, if the bronchial attack be preceded by sneezing and nasal hypersecretion, the application of the electric cautery may be beneficial, just as it is sometimes in hay fever, even if, at the time of application, the parts be fairly normal. I take it that in some of these cases this treatment is beneficial by destroying nerve-endings through which reflex vasomotor changes are produced, while in others good results are obtained by the formation of cicatrices which bind down the erectile tissue, and thus prevent swelling. I do not think, however, that in all cases the paroxysm is preceded by nasal symptoms, even where nasal treatment may do good. I have, however, found that in a considerable proportion of asthmatics there can be detected on the nasal mucosa spots which, when touched with a probe, produce cough. My experience has been that in almost every patient who shows this phenomenon, the application of the electric cautery to these sensitive areas will produce marked amelioration, amounting in some instances to a practical cure. These cough spots may be met with in any part of the mucous membrane, but are most commonly situated on the inferior turbinated body, while occasionally the reflex area may be encountered while passing a probe between a projection from the septum and the outer wall. I have said that I consider the presence of this reflex cough as an indication in favour of intranasal treatment, but I have not found that, when it is absent, such treatment is always useless—although, in the one case, we are entitled to express a conviction in favour of the probability of benefit, while in the other operative measures must be looked upon as more or less experimental, so far as the asthma is concerned. I cannot help thinking that the clinical value of this symptom has been overlooked, although I have repeatedly called attention to it for many years. In this connection a very interesting question confronts us: May it not be possible to benefit asthma in certain cases by applying the cautery to a normal nostril? The fact that we speak of a nasal reflex asthma implies that we admit something like the following chain of circumstances—a stimulus travels from the periphery to a centre, and there sets up molecular changes which result in a paroxysm of asthma. Observe, we admit that an irritant applied to the nasal mucosa may effect molecular changes in a centre which is responsible for asthma. It almost follows as a corollary that we can influence this centre from the nose, and I very much question whether many asthmatics—even those with normal noses—might not be benefited by the use of the electric cautery, not as a destroyer of tissue, but as a counter-irritant.

It may perhaps not be amiss to glance for a moment at the prognosis of nasal asthma. I do not think it is ever safe to promise the patient a cure, because every thinking rhinologist will admit that the nose is rarely, if ever, the only cause of asthma. In cases of polypi, however, we can usually do much good by removal of the growths, and when we have the introduction of a probe into the nostrils followed by cough, the probability of benefit is much increased. In ordinary hypertrophic catarrh and in the case of spines or deviations, the last-named symptom becomes of even more significance.

Asthma caused by other parts of the upper respiratory tract.—While nasal asthma is comparatively common, it is in my experience rare to have this neurosis produced by other parts of the upper respiratory tract. I am aware that cures have been reported after removal of enlarged tonsils and after destroying granulations upon the posterior pharyngeal wall, but I do not remember to have met with such cases myself. On one occasion only have I found asthma apparently cured by removing adenoids from a young boy. I have thought it well thus, at the risk of appearing egotistical, to confine my remarks to an expression of personal experience and views. To discuss the subject by any other method would have occupied much time without any commensurate advantage.

In conclusion, I would venture once more to express my conviction that, while the upper air passages may be the exciting causes of asthma, its occurrence depends upon some individual predisposition. We can therefore hardly speak of cures by local treatment of the nose and throat without modifying the expression, and we must not forget to use such general remedies and modifications of regimen as have been found useful by physicians generally.

ON CARDIAC STRAIN IN ADOLESCENCE AND IN MIDDLE AGE.

By I. Burney Yeo, M.D., F.R.C.P., *Senior Physician to King's College Hospital, and Professor of Medicine in King's College, London.*

The occurrence and conditions of cardiac strain, especially in association with the practice of athletics, have been often described and insisted upon. But, besides these, there are other conditions of heart strain and heart fatigue of less obvious causation and of less manifest urgency, the true nature and appropriate treatment of which are not infrequently overlooked or misapprehended, and it is to these that I propose briefly to call attention.

There are two periods of life in which this condition is apt to arise, and to be misunderstood—the period of adolescence, towards the termination of active growth and development; and the period of middle age, the period of the unsuspected and unwelcome commencement of degeneration and decay.

Upon the accurate appreciation of those conditions and their suitable management frequently depends the avoidance of chronic ill health in youth, and the warding off of degenerative changes in middle age.

It has long been on my mind to call attention to certain cases of this kind, in which it is by no means uncommon to find that active physical exercise has been prescribed and urged, when the remedy needed was rest—systematic physical rest. You will often encounter amongst our own brethren, but more frequently amongst the uninformed laity, many very hard, very strong, very energetic persons, who seem to think *exercise*, physical exertion, must always be a virtue, and *rest* always a kind of vice, nigh akin to idleness. Unfortunately, educationally disposed ladies are not infrequently of this type, and I am disposed to place much of the chronic feebleness and ill health of the adolescents of their own sex at their door. Exercise, like ventilation, is an excellent thing in its way, but let us bear in mind that exercise, like ventilation, may be, and often is, greatly overdone, and may both be responsible for the production of much ill health.

I will first call attention to the occurrence of cardiac strain and cardiac fatigue in young girls about the age of puberty, that period when chlorosis and anæmia are so common. It is, I think, easy to understand why the muscular power of the heart should especially need protection and conservation at that period in young girls. Girls grow and develop with much greater rapidity, as a rule, than boys. Who is there that has not at times been amazed to see the child of 13 or 14 suddenly become the woman of 15 or 16? This rapid physical growth, associated as it is with the sudden development of new functions, and almost a new life, is a great strain on the constitution.

It so happens that, simultaneously with this rapid development, the greatest mental educational efforts are imposed. At this period the bones lengthen, the voluntary muscles increase in size, the sexual organs develop, and the periodical manifestations of this fact become established. It will not rarely occur that the muscular force of the heart does not develop with equal and commensurate rapidity. Coincident educational strain on the nervous system and insufficient physical rest are chiefly the cause of this retarded cardiac development. It is forgotten that the heart is a muscle that never rests, or its rest can only be relative, and it is only by enforced bodily inactivity that we can afford the heart that *relative* rest it so greatly needs during this epoch of rapid development and new functional activities. But it is just at this period that a girl's work, both mental and physical, is increased; her life is often one continual series of occupations, as if it were an absolute necessity that the whole of a girl's mental and physical training should be crammed into two or three years, when the processes of physical growth and development are at their height! It is at this period we become familiar with the appearance of the symptoms of anæmia and chlorosis, and also, if we would not close our eyes to them, the most characteristic signs of a *strained* and *fatigued* heart. Palpitation and dyspnœa on the least effort, a tendency to fainting and giddiness, œdema of the ankles, or even actual pain or hyperæsthesia of the cardiac muscle, and loud cardiac murmurs, are the common accompaniments of this state, and point as distinctly as signs and symptoms of disease can do to strain and fatigue of the cardiac muscle.

The want of success we encounter in treating these cases is mainly due to the fact that we do not fully recognise one of the chief factors in the production of this morbid state, and that is the existence of a strained and fatigued heart. It is not exclusively or mainly an altered condition of the blood which we have to remedy, but the effects of over-strain, sometimes mental as well as physical.

I have said the muscle of the heart becomes actually painful. If you will examine carefully the cardiac region in anæmic girls, you will, if the chest wall is thin, be able to see or feel the impact of the apex of the heart in the fifth intercostal space; press firmly with the point of the fingers over this spot, precisely over the apical impact, and you will frequently find that the pressure is distinctly painful. You will not, however, find it so over adjacent points, but only over the cardiac apex. This painful condition of the cardiac muscle is usually associated with attacks of palpitation, and is indicative of heart strain and fatigue. Unless you notice these cardiac conditions in association with the anæmia of adolescents of the opposite sex, you will rarely succeed in treating effectually their anæmia. You may give them iron in all forms, and aperients in any quantity, and you may send them to chalybeate springs, but they still remain anæmic and feeble.

Too often such patients are said to need exercise; they are thought to be idle and lethargic and to want rousing; and they are made to rise early and to take long walks: and yet they become more and more anæmic and more and more feeble.

Recognise the fact that cardiac strain—a feeble, dilated, overworked heart—is at the root of this ill health, and you are already on the way to effect a cure.

What then is the treatment suitable to this state? Rest, systematic rest, good and suitable food in ample quantity, and cardiac and blood tonics. A young girl suffering from anæmia and heart strain or fatigue, instead of being made to rise at the same early hour as the rest of the family, should be made to remain in bed for two hours longer in the morning. She should have a good substantial breakfast in bed; and on rising, in warm weather, the body should be rapidly sponged with cold or tepid water, and the cold sponge drawn several times down the spine. After dressing she should rest for half an hour. A good meal should be taken in the middle of the day, and she should rest in the horizontal position for an hour or an hour and a half afterwards. A half to three-quarters of an hour's walk twice a day is all the exercise that should be permitted, and she should be allowed to walk at her own pace, and not made to adopt the same pace as stronger people. She should retire to bed early, and she should have some nourishing food, such as milk or good soup, at bedtime, and a glass of milk by her bedside to take, if she wishes it, during the night.

Lessons should be given up, or only used as an amusement, or so far as they are regarded as a pleasant occupation. The anæmic brain is quite unsuited for intellectual efforts of any kind, and the mistaken attempt to push educational efforts in these states is responsible for much nervous excitement, and the production of a loss of nerve tone, often long felt in after life.

With regard to medicines, the preparations of iron, we all know, are of the greatest value, and amongst these the well-known Blaud's pills have a deservedly high reputation; but the addition of a direct cardiac tonic, as a stimulant to the muscular contractions of the heart, will be found to greatly add to their efficiency. I know of none better than nux vomica, and I am in the habit of giving in each dose of the pills, *i.e.* three times a day, 1 gr. of powdered nux vomica. When I can get it taken without any trouble, I like to add a dessert-spoonful of cod-liver oil once a day.

By enforced physical and mental rest, by good and sufficient food, by a life spent as much as possible in the open air, by tonic medicines, designed not only to remedy the defective chemical composition of the blood, but also to remove the cardiac asthenia, —by such means you will rarely fail to cure these cases of anæmia associated with cardiac strain and fatigue in young girls.

I will now pass on to notice some cases of cardiac strain in young men. Whoever has had much experience in examining young men for life assurance, or for any occupation in which physical soundness is considered a requisite quality, must be struck with the great number of youths who present some signs of pulmonary and cardiac strain—I mean some signs of dilatation of the lungs and of dilatation of the right heart. This may not be considerable, and may, during the vigour of youth, be of small concern; but is it not certain that these slight disturbances of the normal state of the air cells of the lungs and the right cavities of the heart diminish, in after life, the resisting power to those attacks of pulmonary disease to which, in this climate, we are so exposed.

I need not dwell on the *causes* of those conditions of strain in heart and lungs, as we observe them in young men. They are well known, and are chiefly too great devotion to athletic sports and violent physical exercises; and, so far as the heart is concerned, we must add as causes, sexual excesses and the use of tobacco. Perhaps one of the most fruitful causes of cardiac strain in young men is the *occasional* return to athletic exercises and competitions, after they have settled down to some more or less sedentary occupation. The mania which seems to seize young men to engage once a week in violent muscular exertion, after perhaps six days spent in a city office, is a fruitful source of cardiac and pulmonary strain. The worst of it is that these exercises are often mistakenly regarded as a means of promoting health, and as sanctioned by medical science.

I have seen some rather alarming instances of the combined influence of over-exertion and tobacco-smoking in producing cardiac strain and fatigue, such as recurrent attacks of faintness and giddiness, persistent headaches, attacks of palpitation and dyspnœa, and great muscular fatigue and languor. If you examine the heart under these circumstances, you will usually find evidences of dilatation, especially of the right heart, and not infrequently a systolic murmur over the mitral area. I have seen such a murmur, disappear in a week on complete relinquishment of tobacco-smoking; I have seen the attacks of fainting entirely disappear after a longer absention from tobacco, and the general health and muscular energy be restored.

The treatment of such cases is simple. It consists in the avoidance of all muscular *effort* and *strain* (moderate and regular exercise may, however, be permitted), an increase of the hours of rest in bed or in the recumbent position (this is a very essential point, especially in *tall* people), the relinquishment of tobacco, the avoidance of sexual excitement, the usual tonic remedies.

Occasionally, in these cases of cardiac and pulmonary strain in young people, you will find slight attacks of hæmoptysis occur. The actual quantity of blood expectorated is usually small, but it often gives rise to a good deal of alarm, and it is rare that the term "incipient phthisis" is not applied to these cases by some one! The blood probably comes from dilated capillaries in the bronchial mucous membrane. It is in these cases that a sea voyage is often recommended, and it is certainly one of the best means of resting and restoring a strained and fatigued heart. The enforced rest and limited scope for exercise incident to a sea voyage is just what is needed. Cricket, football, tennis, and like games can hardly be played on board ship, and there is not much to be done with a bicycle!

Finally, I would call attention very briefly to cardiac strain, as it occurs in middle age. The French people have a saying which, like so many others originating with that witty nation, is full of meaning and truth, that "few people know how to grow old." There is another saying, as to the origin of which I am not sure, that "a man begins to die at forty"! Now, the occurrence of cardiac strain in middle age is greatly due to the fact that men (for it is chiefly in the male sex that this occurs) are slow to realise the changes that the progress of years bring in their train. A man may feel as strong, or he may think himself as strong, between the ages of 45 and 50, as ever he was. But we know well that for the average man changes of a degenerative kind are imminent if they have not actually begun. His teeth, his hair, his skin, his eyes are not exactly what they were at five-and-twenty. I am speaking of the *average* man, not of the exceptional one. His digestion often begins, about this period, to give him some trouble. He finds he cannot digest and assimilate the same amount and the same kind of food as formerly. If he wisely attends to those indications and makes certain appropriate changes in his diet and mode of feeding, and accommodates himself to inevitable alterations in his digestive capacities, things go well and his health is maintained. But if he resents these interferences with his food habits, and persists in the régime which was suitable enough to younger organs and younger activities, he comes to grief in various ways. It is the same with the heart and lungs. They will not bear with impunity the same strain that they have borne in youth, and if, notwithstanding, the same efforts are imposed upon them, they yield to the strain—in short, they become *dilated and strained*, and their functions are impaired. For the tendency to emphysematous dilatation of the air cells, which is prone to occur at this period, the late Dr. Wilson Fox had a good expression,—he said "the lungs were getting grey"!

It is to the prevailing indisposition to recognise these changes that most of the cases of *cardiac strain* in middle life are due. Men will continue to climb in the Alps, to take part in athletic games and contests, and generally to attempt an amount and kind of physical activity for which they are no longer well fitted. The exceptional organisation does this with impunity, and thereby becomes a snare to his weaker brother. To these patients we should preach the gospel of *rest*. Exercise should be gentle, not forced to fatigue. An open-air life is good, provided they are content to sit, or lounge, or stroll about in it. Then the digestive organs must be carefully considered—their labours must also be lightened. Foods of a light and easily digestible form should be taken—pounded meat, chickens, soles, vegetables reduced to *purées*, thin dry toast in place of quantities of new doughy bread. Plenty of time should be given to meals, and good adequate intervals allowed between them. Rest, refreshing rest, must be allowed to the tired stomach as well as to other organs. If anything is needed between meals, to relieve what is usually described as a "sinking" feeling, nothing is better than a teaspoonful of beef-essence or beef-juice in a teacupful of hot water. Alcoholic stimulants should be taken very sparingly. The best tonic is a combination of strychnine and iron, or the former alone if the latter is not well borne.

PRIMARY MALIGNANT DISEASE OF THE PROSTATE GLAND: A CLINICAL STUDY OF THE FIRST FIFTY CASES WHICH HAVE BEEN UNDER THE WRITER'S CARE AND OBSERVATION.

By E. Hurry Fenwick, F.R.C.S., *Surgeon to the London Hospital; Surgeon and Pathologist to St. Peter's Hospital for Urinary Disease, London.*

An experience of fifty undoubted cases of primary malignant disease of the prostate gland convinces me that certain very striking clinical features of this comparatively rare[1] disorder have been overlooked. I venture to briefly record these points for criticism, acceptance, or correction.

DIVISIONS.—I submit that there is no practical value in grouping malignant disease of the prostate according to the microscopical character of the growth. It will be found that two great groups will embrace all the instances which are met with, and these two divisions will differ most markedly in their symptomatology, prognosis, and treatment—(*A*) The hard malignant growth, which to the touch and to the eye on section, and in its rate of progress, is like mammary scirrhus. (*B*) The soft malignant growth, a much rarer form,[2] which resembles in the rapidity of its growth, and in the naked-eye appearances, mammary "encephaloid cancer."

Between these two groups a mixed form is occasionally encountered, neither densely hard nor yet very soft, and partaking of the clinical characters of both groups.

(*A*) PRIMARY HARD MALIGNANT GROWTH OF THE PROSTATE.—There are three pronounced stages in the development of a hard malignant growth starting primarily in the prostate gland. Each stage has well-defined symptoms, and the transition from the first to the second stage is often very striking in its abruptness.

First stage.—(*a*) *Tactile recognition.*—The finger detects per rectum[3] a distinct hardness, often like a buried stone, in one or other prostatic lobe (71 per cent. of my cases started in one lobe). This lump does not project at first, being buried in the substance of the lobe; its ill-defined edge shades off imperceptibly into the unusual denseness which can be detected around it. It reminds one of a stone felt in a half-ripened plum. The other lobe is soft and healthy. Soon, however, the latter becomes dense, almost like wood, but still the interlobar sulcus is maintained. As time goes on, the finger recognises the increase in the tension of the prostatic capsule, until, like glaucoma, it increases to a condition of extreme tension.

Clinical evidences.—The clinical features correspond. The onset of the disease is (in 60 per cent. of my cases) marked by frequent micturition, by loss of stream-power, by straining to empty the bladder. These are the usual onset symptoms, but the patient may have allowed the initial symptoms to pass unnoticed, and the first which has forced itself upon his attention may have been an attack of retention (16 per cent.)—very rarely is incontinence the onset symptom (4 per cent.). These symptoms are, of course, explained by the prostatic urethra becoming gradually narrowed by the carcinoma developing within the tight prostatic capsule. As they arise at the "prostatic" age (50 to 60), and as they are the same as those caused by the obstruction of the "enlarged prostate," the benign disease is often mistaken for the malignant.

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[1] "Malignant disease affects the prostate very rarely, either as a primary or secondary disease."—H. Morris, "Urinary Organs," 1898, p. 322. The disease is, I believe, only comparatively rare.

[2] This statement is a direct contradiction of current literature.

[3] At what date may primary malignant growth (hard) of the prostate be detected? It is probably detectable in many cases at the very onset of the prostatic symptoms. Indeed, in one case, the disease was far advanced, and the characteristic emaciation had appeared, before the urinary symptoms (Case 44). I have met with characteristic stony prostates, although the urinary symptoms had only been noticed three weeks (Case 44); one month (Case 21); six weeks (Case 39); two months (Case 40); three months (Case 36); and in these the diagnosis was confirmed subsequently by operation, or post-mortem. Most of my patients have, however, applied later in the course of their disease. Compare difficulty in diagnosis.

The second stage.—The "latent" period, due to capsular rupture.—Just when the sense of obstruction and urgent frequency of micturition are most distressing, there suddenly appears in many instances a "lucid interval." A sudden relief of all the symptoms is experienced, a release from actual pain, which is paralleled by the subsidence of suffering induced by tension in other fibrous capsules, *e.g.* acute glaucoma, acute testitis, when the pressure is suddenly removed. The lucid interval is due to the capsule of the prostatic lobe giving way at its posterior aspect and base, just where it joins the adjacent vesicula seminalis.

The patient pronounces himself suddenly cured. If he has had to use the catheter, he finds he can get along without it; if he has struggled up to this stage without the catheter, he often empties his bladder much less frequently in the day, and sleeps all night. We congratulate ourselves upon our skill, or maybe the patient writes a glowing testimonial for the particular patent medicine he was secretly absorbing at the time, and for a brief space all is well.

A cautious or inquisitive practitioner would examine per rectum, to ascertain the cause for this sudden improvement. He will find the dense stone-cord prostatic lobe flattened, but elongated towards and apparently fused with the corresponding seminal vesicle.

Such is the intermediate stage between tension and extension of growth. It occurs only in the very hard forms. I can illustrate this statement by one which is beyond criticism.

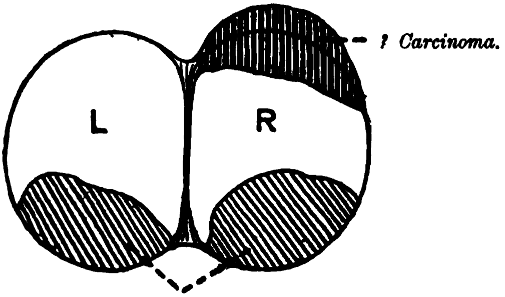


Fig. 1.—Prostate of G. M., taken 2nd October 1897.

CASE 1.—G.M., æt. 69, consulted me, October 1897, for difficulty in and frequency of micturition. He had noticed these symptoms for three or four months. He also had lumbar pain, which was worse if he stretched his legs out in bed: therefore he slept "curled up" (a hint about abdominal wall pressure on pelvic contents). Residual urine amounted to half a pint.

On 2nd October 1897 I examined the prostate, and was at once struck with it.

My note ran, "Prostatic lobes small; very dense, texture like wood; sulcus present; vesicular end of right prostatic lobe uneven; a buried hardness here suggestive of carcinoma (Fig. 1)—Mst. potass. citratis.

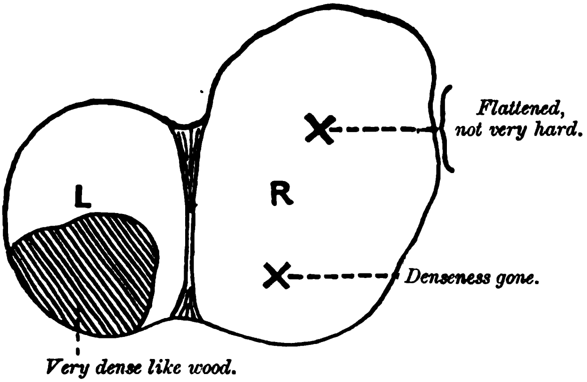


FIG. 2.—Prostate of G. M., 13th November 1897.

13*th November* 1897.—Improved in every respect; prostate changed. The right lobe has lost its wooden-like denseness, the vesicular margin is flattened out. It has lost its stony feel (Fig. 2).

27*th November* 1897.—Much better.

11*th December* 1897.—Patient well, he disappears.

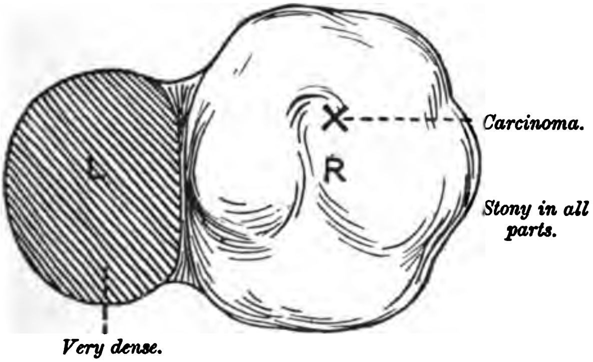
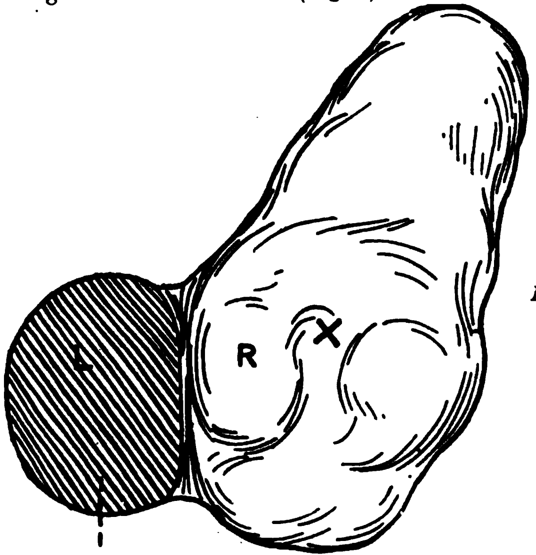


FIG. 3.—Prostate of G. M., 5th November 1898.

Patient remained away an entire year, and returned 5th November 1898. He stated he had been well up to a month ago, when all the old symptoms returned in an aggravated form. On examination, the right lobe of the prostate was found large, nodular, and stony hard, obviously carcinomatous (Fig. 3). He now rapidly lost flesh—his appetite failed. He complained of right sciatic pains, and the glands in the right groin enlarged. Hard malignant mass in the right.

January 1899.—The prostatic lobe was found to have extended along the right side of the bladder (Fig. 4). He is failing.



Extending upwards.

Very dense.

Fig. 4.—Prostate of G. M., January 1899.

Note upon the capsular rupture.—There is apparently much difference in the manner in which the rupture is effected, although the site of the split is nearly always towards the angle which the base builds with the posterior surface of the lobe. In some cases, apparently in the more active of the hard variety, the latent period appears early in the course of the disease, and it is of shorter duration. The harder and more indolent the growth, the more delayed will be the appearance and the more protracted the duration of the latent period. The softer forms invade and soften the capsule, which gives way so gradually as not to be noticeable. There are two unfailing symptoms of the supervention of this rupture and extension. These are rapid emaciation and the appearance of obstinate sciatic nerve pains.

The third stage.—This is a period marked by rapid emaciation, by involvement of chains of the pelvo-abdominal lymphatics and glands, and by the effects of the pressure of the latter upon nerves and vessels; also by unilateral renal pain, due to throttling of the ureter by the encircling growth, *this* occurring usually on the side on which the growth first appeared.

Two remarks may be permitted. The hæmorrhage which *occasionally* appears in the third stage may be profuse; it marks invasion[1] of the mucous membrane of the bladder base, usually on the side on which the growth first appeared in the prostate. It generally indicates a septic termination of the case.

Agonising spasms indicate the spread of the hard growth between the muscular planes.

DIFFICULTY IN DIAGNOSIS.—The above remarks, it must be understood, apply only to a hard malignant growth arising in a *virgin* prostate. When carcinoma attacks a chronically inflamed prostate, it has no typical clinical course, no tactile characteristic beyond a dense indurated mass. Such a case must be grouped as obscure, and must be deciphered on other grounds than its history. It must also be borne in mind that a prostate enlarged by old age, hardened by inflammation, and fretted by the presence of seed calculi, is of all prostatic diseases most nearly akin in clinical features to carcinoma.

TREATMENT.—*Therapeutic.*—The frequency and straining by which the first stage is characterised are perceptibly relieved by belladonna and conium. They are best administered by the bowel in a suppository. Nux vomica, which is of such signal benefit in the earlier stages of the "hypertrophied" prostate, is generally contra-indicated in hard carcinoma. This is perhaps more especially the case when the growth has invaded the muscular planes of the bladder base, for it aggravates spasm and induces a wooden-like priapism of a particularly painful character. The patient depends greatly upon free and daily clearance of the bowel.

Morphia should be kept, as far as is possible, for actual pain of nerve pressure. It is worth while trying the modern anti-neuralgic drugs, to combat those distressing nerve pains in the lumbar, perineal, and sciatic regions, which are the result of direct pressure of the infiltrated glands upon the nerve trunks or branches.

Instrumental.—The employment of the catheter is usually a matter of judgment. In a certain proportion of the cases, however, the question of its utility cannot be raised, for the practitioner is summoned to relieve retention (16 per cent.), in which case, a soft rubber (Jacques) or a silk web catheter is passed much easier than a silver, the pliant instrument finding its way round the corners of the irregular urethra easily, whilst the rigid instrument strikes and wounds some lateral abutment of prostatic growth which projects into the urethra, and often renders it impassable to steel instruments.

But suppose the question is raised by the patient, as to how far he may expect to be relieved by the catheter, the answer must be framed according to the amount of *residual* urine removed.

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[1] In some rare instances the mucous membrane of the adjoining urinary tract is invaded *early*, and hæmorrhage occurs early. This inward extension does not in any way prevent the external pressure which leads to capsular rupture, though it introduces a grave element into prognosis.

Irritability of the bladder is in this disease the outcome of two independent factors, either or both of which may be present. It may be due to the atony of obstruction, in which case the residual is large; or it may be caused by the physiological effects of irritation of the growth invading the mucous membrane of the prostatic urethra or bladder neck, in which case slight hæmorrhages appear *early* in the case, and the residual urine is small in amount.

If 8 to 10 oz. of residual are removed, the patient may be promised relief. If only a small amount, 1 or 2 oz., are found, the case will be most unfavourable, and probably necessitate suprapubic drainage to give the patient relief from the frequent agony of micturition, which is much increased by carcinomatous urethritis.

Suprapubic drainage is also called for in those cases in which great spasm of the detrusor is excited by intramuscular growth.

Perineal section, in any case of malignant prostate, is generally the index of gross carelessness or culpable ignorance on the part of the surgeon in charge of the case. It often induces indescribable torture and has caused mania. The only perineal operation permissible is prostatic capsulotomy, to relieve extreme tension, and this latter is only substituting one line of extension for another. Colotomy is very rarely needed, for rectal obstruction, due to extension of the disease to the walls of the bowel, is unusual. I do not enter into the question of removal of the prostate. Such an operation can be but seldom practicable, still less can it be useful when the diagnosis is sufficiently established to warrant the risk.

PROGNOSIS.—The duration of life in primary hard malignant growth of the virgin prostate, from start to finish, lies within three years. The termination of the case is either due to ascending septic changes in one kidney, or asthenia; the former is probably the commoner. In rarer cases the rectum is affected, and obstruction ensues.

The stress of the disease usually falls upon one of two positions: either upon the mucous membrane of the bladder, when profuse recurrent hæmorrhages will appear; or upon the lymphatics of the bladder base and pelvis, when pain and marked wasting will ensue. Hence an inference of the course of the disorder may be drawn from the presence or absence of hæmorrhage (not that due to the catheter, of course).

Thus a large amount of residual urine, an absence of hæmorrhage, denotes that the march of invasion is away from the mucous membranes of the bladder and prostatic urethra. You therefore prognose a course of less suffering from the bladder but more suffering from secondary deposits, such as those pressing on nerve trunks (deposits in the sacro-sciatic foramen or spinal column).

On the other hand, repeated small hæmorrhages early in the case mark invasion of the prostatic urethra—a case not easily relievable by catheter. These are followed by copious hæmorrhages of blood (not produced by rough instruments), and often comparatively rapid failure from septic absorption and ascending renal changes.

(*B*) THE VERY SOFT MALIGNANT TYPE.—But little need be said about this rare disease, as it will be but seldom encountered. I have met with six cases in fifty. In all, the growth was extremely rapid, and the first indication of its presence was rectal obstruction or retention. The growth in each case was found to be enormous, the finger entering the rectum with difficulty, and in two cases plunging at once into a soft, bleeding, pulpy mass on the anterior wall. I have been forced on three occasions to colotomise within a few weeks of the symptoms.[1] Such cases generally die quickly of septicity. They are generally diagnosed as prostatic abscess at the outset.

AN OUTBREAK OF TYPHUS FEVER.

History—By HARVEY LITTLEJOHN, M.A., M.B., B.Sc., F.R.C.S.Ed.
Clinical Features—By CLAUDE B. KER, M.D. M.R.C.P.Ed.,
Superintendent, City Fever Hospital, Edinburgh.

(*Concluded from* Vol. V., *page* 563.)

THE CLINICAL FEATURES OF AN OUTBREAK OF TYPHUS FEVER.

THE whole subject of typhus has been so completely and admirably treated in the great work of Murchison, and has been so thoroughly summarised and brought up to date in Moore's book on the infectious fevers, that I feel it is necessary to apologise before entering on this paper. The only excuse that I can offer is, that it is so long since we have had so many cases together in Edinburgh, that it may be of some interest to describe the fever as we saw it in the wards of the City Hospital, and see if there has been any change in its characteristics since the time when it was endemic in the Old Town.

It is not in my province to speak of the predisposing causes of typhus; and of the exciting cause, almost certainly a micro-organism, we as yet know absolutely nothing. Various germs have been isolated by different observers without any absolute proof that they are the cause of the disease. During the recent outbreak, two former assistant medical officers of the hospital were good enough to undertake a bacteriological research; but though they have had some very interesting results, it is too early to say if they are to be fortunate enough to clear up the mystery which at present enwraps the origin of the fever.

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[1] *Brit. Med. Journ.*, London, 1887, vol. ii. p. 1731.

Incubation period.—It is generally admitted that the period of incubation in typhus may vary considerably in length, being in some instances only a few days, whereas in others it may be prolonged for nearly three weeks. During the recent outbreak the patients have for the most part lived in such intimate relations with each other, and have been exposed on so many occasions to the contagion, that it is absolutely impossible in the vast majority of the cases to define the length of the period. In one instance, however, the patient had only one chance of exposure, and his first symptoms occurred thirteen days afterwards. One of our ambulance attendants fell ill twelve days after destroying infected fomites. Another case took over seventeen days to develop his fever. During this time he was kept in quarantine, and certainly was not exposed to infection. On the other hand, though the statutory period of quarantine adopted was only fourteen days, and many persons were discharged after that interval, none of them returned to us with the disease.

Invasion period.—The onset of typhus is very sudden, and the patient can as a rule tell not only the day but even the actual hour of his attack. The first symptoms to be complained of are usually severe headache, and a feeling of chill often accompanied by actual shivering. Pains in the limbs and back are also frequently felt, and at least two of our cases were from this cause diagnosed as rheumatic fever. It is usually stated (Murchison and Moore) that, while nausea is frequent, vomiting is rare. It is therefore of some interest to note that in my cases vomiting was a quite common symptom, occurring in three-fourths of the

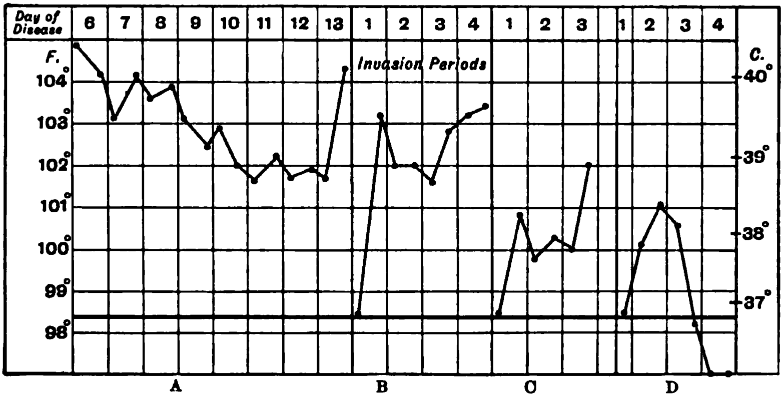

FIG. 1.—A, a fatal case; B and C, showing different forms of invasion (illustrated also by Figs. 2 A, and 4); D, chart of an infant exposed to the infection.

children and in nearly half the adults. Rigors were not very common. As regards the relative frequency of the other symptoms, it may be said that headache was practically invariable; that a feeling of chilliness was noted in 80 per cent. of the cases; and, lastly, that the three symptoms—headache, chilliness, and vomiting—were combined in 37 per cent. of the admissions.

The temperature commences to rise at once, and in most cases reaches the acme in three days. Occasionally there is a sudden rise to a high level on the first evening, but this only occurred in two out of eleven cases watched from the inception of the disease, all the others mounting comparatively slowly. In the case of two children and of one adult there was actually a fall to normal on the second day.

Even at this early stage the patient often may be diagnosed by his appearance. The face is usually congested and stupid, while the eyes are pink and watery. Great depression is always felt, and it is quite exceptional for a typhus patient to keep on his feet after the third day.

Period of advance and eruption.—This period may be said to start on the fourth day. The patient has taken to his bed, and suffers chiefly from headache, thirst, and insomnia. The temperature in an average case is 103° or 104°, and the pulse is accelerated in proportion to this elevation. The tongue, which during the period of invasion has been covered with a close, white fur, now becomes dry and yellow, and sordes appear on the lips and teeth. There is always great confusion of ideas, and the patient suffers from deafness. There is often slight delirium at night. As a rule, the bowels are constipated.

The rash in my cases was usually well out by the fourth day. It may be said to consist of three main elements. First, spots appear on the surface of the skin. These spots are at first very like those of enteric fever. They are rose-pink in colour, and fade easily on pressure, and for the first few hours of their existence are distinctly raised above the skin. After they have been out for a couple of days, they become a dirty brown in colour, and do not disappear on pressure. In distribution this rash is present all over the body except the face. The spots are somewhat irregular in outline, and give a measly appearance to the patient. The second element of the typhus eruption consists of similar spots lying, not on the skin, but faintly seen as it were beneath it, and causing what is known as "subcuticular mottling." This is best seen on the trunk, and perhaps best of all in the axillæ. Lastly, true hæmorrhage may occur into either the cuticular or subcuticular spots, giving rise to dark purple petechiæ, exceedingly like flea-bites, but lacking the central point.

While it is usually stated that the rash is not visible before the fourth day, I noted that the subcuticular element was as a rule present in my cases on the third, and in one or two instances quite recognisable, though very faint, on the second. It was present more or less distinctly in all my adult cases, and was observed in all the children except two. Unless the petechial element is very marked, the rash begins to fade in the second week of the fever, though staining occasionally persists for some days after the crisis.

At the end of the first week the patient is apt to suffer from restless delirium. He appears very drunk, and probably tries to get out of bed. In severe cases, especially if they have been alcoholic, the excitement may be intense, the so-called delirium ferox setting in. It is this wild delirium which occasionally causes patients to throw themselves from windows, and when it has developed it is safer to use straps or some other method of restraint.

By the time the patient enters the second week of his fever, he is usually too exhausted to continue wildly delirious. He is now more likely to be lying helpless on his back and muttering only. If at all severe, he has subsultus tendinum, and picks at the bedclothes. In this helpless state he drifts through the remainder of his fever, passing his evacuations under him, and often taking his nourishment only with difficulty. The face is now more drunken and bloated than ever, the eyes are bloodshot, and the pupils are contracted. The tongue, if not properly attended to, becomes crusted and black, and may be shrivelled and pointed. The pulse loses its tone, and is apt to run. There is nearly always some hypostatic congestion of the lungs.

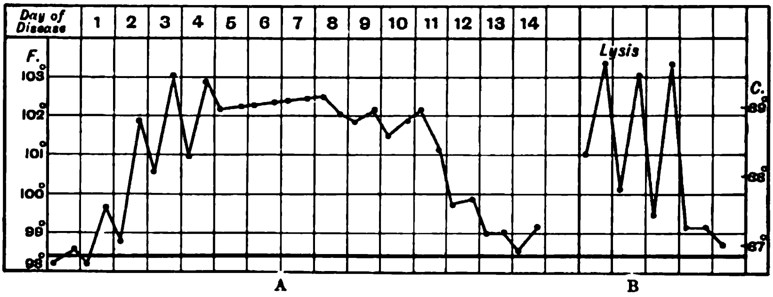

FIG. 2.—A, Complete course of fever in woman æt. 67 ; B, example of termination by lysis in a child.

Stage of defervescence.—Towards the middle or end of the second week there is often a considerable improvement. Cases which are going to recover seldom reach the fourteenth day without some amelioration. On the other hand, fatal cases get progressively worse during the second week, though most of my own cases did not die before the fourteenth day.

The termination of the fever may be expected about the thirteenth, fourteenth, or fifteenth days. The crisis is in some cases exceedingly well marked, but it is not as a rule very rapid. In this group of cases it never took less than two days to bring the temperature to normal, and in the majority took three. The improvement of the patients with the fall of temperature was very striking, and, as a rule, there was not much sweating during the process, nor was there much tendency to collapse. After the temperature fell it usually remained subnormal for nearly a week, and during that time the pulse remained slow and shabby, with a tendency to intermit. As soon as the fever was over, the patients took their food ravenously, and put on weight rapidly.

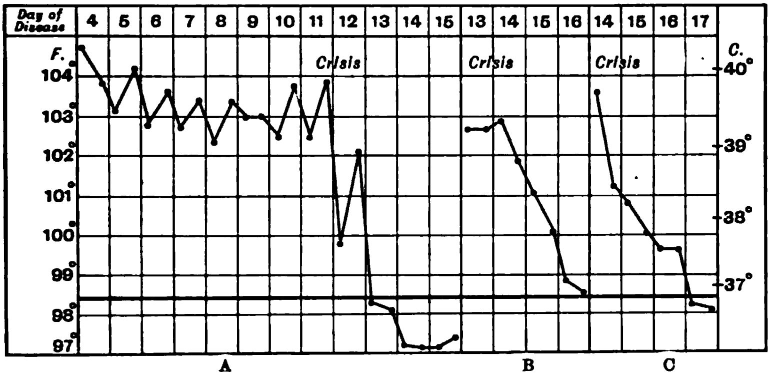

FIG. 3.—A, Chart of a girl of 14, with termination by crisis; B and C, examples of termination by crisis in adults.

If, on the other hand, the termination is going to be a fatal one, the temperature, instead of falling gently from the middle of the second week, remains level, or may show a tendency to rise. Six of the fatal cases died just at the fourteenth day, and with rising temperatures. The remaining three survived their crisis to die of exhaustion in a few days later.

While the above may be taken to be a rough sketch of the average course of the fever, it may be of some interest to give a more detailed analysis of the cases of this outbreak. First, as regards the duration of the disease, the evening temperature of my adult patients became on an average steadily normal on the fifteenth day. The children ran a shorter course, attaining the normal on an average in eleven days and a half.

The nervous system is always severely affected in typhus, and my cases showed no exception to this rule. Delirium occurred in forty out of fifty-one adult cases. It was chiefly of the low, muttering type; but three cases, all males, and all of which ended fatally, had true delirium ferox about the end of their first week. Persistent insomnia was another very common symptom, complicating nearly half the adult cases. Subsultus tendinum was noted in over a third of the adults. Twitching of the muscles of the face occurred in six cases only, and in two of these there were actual convulsions of a choreic character, starting in the face and spreading to the upper extremities. Incontinence of urine was also frequently present, nineteen of the fifty-one adult patients suffering from this condition. Twelve adults showed retention of urine, and nearly all these required the use of the catheter for several days.

The urine in nearly all the adult cases contained albumin, thirty-eight out of the fifty-one having this complication as long as the temperature remained up. In only a few of these, however, was it present in any considerable quantity. Fifteen cases were examined for Ehrlich's diazo reaction, and every one of them gave it well, showing conclusively what little reliance can be placed on that test as a differential diagnosis between enteric and typhus.

The bowels in all my cases were very constipated for the first week. About the tenth day, however, there is a slight tendency to looseness. This is a point of some practical importance, as one is very tempted to use purgatives, and one given at this juncture is very apt to set up an intractable diarrhœa. In fact, I am far more careful about the administration of aperients in typhus than even in enteric.

I was fortunate enough to have one case which illustrated the fact that it is possible to suffer from this fever twice. A woman, who was treated in the hospital six years ago for typhus, and who at that time undoubtedly had a severe attack of the fever, contracted it a second time, and walked into the hospital saying that she had it. We were a little incredulous, but the result proved she was right.

Complications.—Except for the very frequent occurrence of hypostatic pneumonia, the cases suffered from very few complications. Two women were admitted pregnant, at the eighth and fifth months respectively, and both recovered without abortion. Two women had true lobar pneumonia, and one of the fatal cases was complicated with a severe bronchitis. Three cases, all women, had otorrhœa, and this in one instance was followed by Bell's paralysis. In seven cases diarrhœa was serious enough to assume the importance of a complication. As regards sequelæ, one man had parotitis, another a sharp attack of nephritis, while boils and small abscesses of the nature of those which occasionally retard convalescence of enteric fever gave considerable trouble to three patients.

Mortality and prognosis.—Nine of my cases proved fatal out of a total of seventy-nine. This gives a mortality of nearly 11½ per cent., the exact figure being 11·39. Age, as all observers have agreed, seems to have a great influence on the death-rate. Thus of twenty-four individuals below 12 years of age none died, and of thirty-five under 20 years only one, giving a rate of 2·8 per cent. Of thirty patients from 20 to 40 years of age, four died, a rate of

13·3 per cent.; and the increase in the percentage of deaths is still more marked in the fourteen remaining cases of more than 40 years of age, of whom no less than four succumbed, the death-rate rising to 28·5 per cent., or more than double that of the preceding group.

As regards sex, females are admitted by most authorities to have a lower death-rate than males. Of the nine fatal cases which occurred in the City Hospital, seven were men. Murchison has suggested that the greater muscular development of men offered, as it were, more material for the disintegration caused by the fever process, or, as we might say nowadays, more pabulum for the unknown germ that causes the disease. He also pointed out that male patients were more likely to be alcoholic. I think my own few cases bear out this theory very well, as all the men who died were, without exception, large, heavy, and very muscular men, and five of them were distinctly alcoholic cases. The adult males that survived were, it is true, in many instances alcoholic, but only two or three of them were physically the equals of the seven who died. It would almost seem that a fine physique is a distinct disadvantage to a man starting an attack of typhus. Mere body weight appears to have something to do with it, as the most severe cases among the women were those who were fattest and heaviest. The figures relating to sex death-rates are as follows: Of thirty-eight males of all ages, seven, or 18·4 per cent., died; of forty-one females of all ages, two, or 4·8 per cent., died; whereas, if we take merely the adult cases, the percentage death-rate of males is 26 per cent., while that of females is only 7·14.

The prognosis of the fever, then, must be largely influenced by questions of sex and age. After this, probably the most important aid to prognosis is the condition of the nervous system. A patient who sleeps well, who has no subsultus tendinum, and who is able to be roused sufficiently from his lethargic condition to put out his tongue when asked, will be likely to recover. On the other hand, severe nervous symptoms, especially either wild delirium or coma, are of evil omen. The rash also gives a direct indication as to the severity of the case; profuse rashes, with many petechiæ, showing that the case is likely to be a serious one. Without being a very ardent believer in the old views about critical days, I am inclined to think that there is something to be gained in the way of prognosis by a careful study of the temperature about the seventh day. A very large number of my charts show a slight fall of temperature at that period, and some cases seem to start, as it were, a very slow lysis from that time to the thirteenth day, when the fall becomes more abrupt. Such a gentle decline of the fever is always a good sign.

Diagnosis.—A history of exposure to the disease, a sudden onset and early prostration, accompanied by mental confusion, should, if there is an epidemic, suggest the fever. The congested face and red eyes are also very suggestive. The presence of the rash is of course final, but it may be exceedingly difficult to see in the dark rooms usually the home of typhus patients; and, again, a good wash is often required before it becomes visible. Many of our cases were sent in as enteric fever, and when the rash is badly developed that is the most natural mistake. To distinguish the two fevers, as I have mentioned above, there is no assistance to be got from Ehrlich's reaction. Widal's reaction is the best method to use if in doubt. I am quite satisfied that it is to be relied on. Previous to this epidemic I found it present in two cases of typhus out of ten examined. I believe that this apparent inconsistency is due to the cases in question having suffered from typhoid at some previous date. During the recent outbreak I used the reaction in all cases where a differential diagnosis was required. In all the ten cases of undoubted typhus the reaction was not present. There should be little difficulty in distinguishing the disease from measles, the history of or the presence of a rash on the face pointing to the latter. As regards acute lobar pneumonia, the differential diagnosis may be exceedingly difficult. In uncomplicated typhus there is often dulness at the bases of the lungs, but this is not restricted to the limits of the lobe, and tubular breathing is not present. The respirations, moreover, though accelerated, are usually only slightly more rapid than the temperature would account for. Perhaps the most difficult cases of all to differentiate are bad influenzas, and, as I have said above, acute rheumatism may have to be remembered.

No remarks about the diagnosis of typhus would be complete without some allusion to the characteristic odour of the fever. This odour has been compared to that of mice and also to that of rotten straw. I think personally that it is peculiar and unpleasant enough to be acknowledged as an odour *sui generis*. It appears to be given off from the skin of nearly all typhus patients at some period or other of the disease. Its development is, I am certain, entirely independent of the cleanliness of the patients, as I found it unmistakably present in patients who had been three weeks and more in hospital at a time when they were well advanced in convalescence. It is of undoubted value in diagnosis, as, if it is noticed at all, it cannot possibly be mistaken for anything else. It is usually more appreciated by nurses than by doctors, probably because their sense of smell is not impaired by smoking. In two instances I was able to pick cases out of my enteric wards, which, having mild symptoms and very badly developed rashes, would have been missed altogether, had it not been that their very suspicious smell attracted my attention.

Treatment.—In an acute fever that runs a definite course there is seldom much to be done in the way of active treatment, and typhus is no exception to this rule. In the first place, care was taken to keep up the patient's strength. The liberal use of strong beef-teas and various meat-juices saved the hospital a considerable outlay on stimulants. The staple diet was milk, and this in some cases was supplemented by Benger's food. The milk was invariably given in measured quantities in the form of small meals every two hours, and cold water was given to, and indeed forced on, the patients between times. As soon as the patient had a normal temperature, fish, bread and milk, and eggs were allowed.

The question of stimulating in fevers is always interesting. Typhus is one of those that seems in most cases to require stimulants. While in every case meat-juices were first given a trial, nearly three-quarters of the adult cases and nearly a third of the children required alcohol at some period or other of their course. Whisky was used in each instance except in one case, where stimulants of all kinds were badly borne, and brandy and champagne were used without effect.

As to cardiac tonics other than alcohol, I cannot say that we found them of much service. Strophanthus in two or three cases seemed to do good, but was exceedingly disappointing in others. Strychnine, perhaps, had the best effect on the pulse, but increased the nervous excitement in several cases so markedly that it had to be stopped.

Nearly half the adult patients required one or more doses of a hypnotic. I found I got the best results by giving hypnotics early and freely. Waiting too long meant frequently failure of even a very heavy dose to act. Both sulphonal and paraldehyde were found useful, the former causing a much more prolonged sleep, but often seeming to increase rather than diminish the ataxic symptoms of the patient. In the cases where there was much facial twitching I used chloral cautiously, and in one or two instances undoubtedly to good effect.

Great attention must always be paid to the condition of the bladder, especially in the case of delirious patients. A routine percussion of the organ twice daily will save a great deal of subsequent trouble with the catheter. When the use of an instrument becomes imperative, it is advisable to draw off the urine at least every twelve, and preferably every eight hours.

The temperature was in no case interfered with by drugs. Even in those cases which ran continuously at a level of 105°, the most that was done was the frequent use of tepid sponges. No case suffered from hyperpyrexia. This may have been possibly due to the fact that the wards were kept at a very low temperature, and the patients allowed only one sheet and one blanket as long as their temperature remained up. In addition to this, many of the sharper cases, if they were passing their evacuations under them, were left naked, in order to save them the exhaustion undoubtedly caused by the frequent changing of soiled night shirts. It is almost needless to say that there was no complaint of cold from patients suffering from high temperatures, and I am inclined to believe that this method of surface cooling has to a certain extent the effect that would be obtained by cold baths, while it is much easier to carry out. It is in fact the treatment by "the ambient air," recommended by de Souza as a substitute for baths in enteric fever. The ward temperature never exceeded 60° F., and was much more often 55° F. in the daytime, while at night it was frequently below 50° F. As the outbreak occurred in the winter, there was no difficulty at all in maintaining this low level, by keeping open all the doors and windows at all times. When the crisis had occurred, extra blankets were at once added to the bed, and it was usually found useful to wrap another blanket round the head and shoulders. As soon as possible, also, the patient was removed to a convalescent ward, kept at an ordinary temperature. I may add that there was no instance of a patient catching cold even under these somewhat severe conditions.

There were in all sixteen nurses exposed to the fever and four doctors. It is a great contrast from the old days of typhus epidemics in Edinburgh, to be able to report that none of these took the disease. It is true that one of our nurses died of the fever, but, however she may have contracted it, she was never exposed to it in the wards. I attribute the immunity of the others to the very free ventilation I insisted on maintaining in the wards, and to the great care exercised in the supervision of their general health. They were advised to take particular care of their bowels, to take frequent baths, to secure a healthy action of their skin, and to get regular and frequent exercise in the open air. Any nurse who appeared to be losing her appetite was at once removed from the wards, but I am bound to say that, with the exception of the so-called typhus headaches, from which all of us who came in contact with the fever often suffered, the health of the staff remained very good. I may say here that colds, in spite of the chilly and draughty condition of the wards, were unknown, and that the nurses in no way seemed to suffer from the undoubted discomforts of the temperature to which I felt bound to expose them.

Another precaution, that of frequently sponging the patients with an antiseptic solution, may also have contributed to the safety of the nurses. Every case in the wards, whether acute or convalescent, was sponged twice daily with Jeyes' fluid diluted with water. This not only kept down the odour of the disease so well that it was impossible to appreciate it on entering the ward, but was probably also of some real value as a prophylactic. The toilet of the patients' mouths was also carefully attended to, swabs of Listerine and of an ointment of boracic acid and menthol being used every few hours.

In the wards set apart for quarantine I found it convenient to keep the patients in bed. This may seem at first sight somewhat of a hardship, but curiously enough I had not a single complaint, and therefore am justified in supposing that it did not fall very heavily on the persons secluded. The advantage of such a system depends on the certainty which it gives that any person who develops the fever has not been in actual contact with anyone else in the ward, the chances of the disease being transmitted from bed to bed during the few hours that elapse before the patient's removal being too remote to be seriously considered. The temperature of all persons under observation was taken regularly night and morning, and also at the first complaint of headache or malaise.

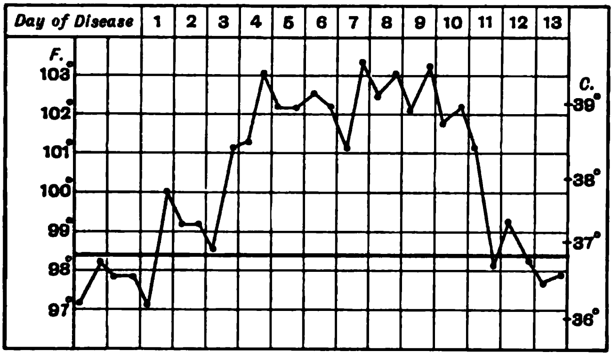

FIG. 4.—Chart of a child æt. 5, showing insidious invasion and short duration.

The fever in children.—An account of the outbreak would not be complete without some allusion to the course of this fever in children, especially as the number of children affected has been so high. It has been noted above that the mortality of the children treated was nil. And it may be said that the incidence of all the severer symptoms of the disease was much less than in adults. The temperature, though in some cases fairly severe, was in most subacute. The actual duration of the fever was less, several of the cases terminating by crisis about the seventh day. Others, though having good rashes and well-marked symptoms, terminated by a regular lysis, lasting in some instances five or six days. Not one had albuminuria, only two had subsultus, and not more than seven had delirium.

While I have only included in the above notes, cases that were undoubted typhus, I had occasion to move two or three cases from, the quarantine wards suffering from indefinite temperatures, which lasted only two or three days. There were practically no other symptoms, but I incline, rightly or wrongly, to the belief that the patients, all very young children, were in reality affected with an abortive form of the fever. Unfortunately, it is impossible to prove this theory. The fact that they did not contract the disease when transferred to the typhus wards goes for nothing, as, if they escaped it under the bad sanitary conditions of their own homes, it is highly improbable that they should catch it in our well-aired wards.

Before concluding this paper, I would like to acknowledge valuable assistance received from Dr. Littlejohn in the diagnosis of doubtful cases, and from Dr. Wyllie, the consulting physician to the hospital, in the treatment and general management of the patients.

In conclusion, I think that the heavy death-rate among the adult male patients, the heavy incidence of the nervous phenomena, and the severity of the rashes, prove that this outbreak was at least of average severity, and that there has been no change of type since the days when the fever used to infest this city. This view was also taken by senior members of the profession who saw these cases, and who remembered the epidemics of old days. Under the circumstances, then, I think we have to congratulate ourselves, both on the rapidity with which it was stamped out by the public health authorities, and on the fact that none of the persons attending on it lost their lives.

REPEATED ECTOPIC GESTATION IN THE SAME PATIENT.

By John Edgar, M.A., B.Sc., M.B., F.F.P. & S.G., *Professor of Midwifery and Diseases of Women, Anderson's College Medical School*; with Pathological Report by John H. Teacher, M.B., *Glasgow.*

In the February number of this Journal, Dr. Haig Ferguson has described an extremely interesting case of repeated ectopic gestation in the same patient. At the beginning of his paper he says: "The case which I am about to record has this unique characteristic, that it is the first, so far as I can find, which has been actually demonstrated in Scotland, though Reid of Glasgow described a case last year, which in all likelihood belongs to the same category." On looking up the reference given, I find that Reid's case was operated on in March 1897, and a description of it was read before the May meeting of the Glasgow Pathological and Clinical Society, and printed in the *Glasgow Med. Journ.* in August of the same year. A careful examination of the report shows, in my opinion, no evidence justifying its being regarded as a case of repeated ectopic gestation, and certainly Dr. Reid himself did not consider it to be such.

In view of Dr. Haig Ferguson's assertion, I desire to call attention to the fact that in April 1897, a month before Reid described his case, I read before the Glasgow Obstetrical and Gynæcological Society, the notes of an undoubted example of repeated tubal pregnancy, operated on by me in November 1896 (specimens shown at the meeting). The report was published.[1] The only possible explanation why it should have been overlooked must be, that it was included in a series of seven cases of ectopic gestation, and so did not appear in the index as repeated tubal pregnancy. For the same reason, no doubt, many more reports of such cases lie hidden in the now copious literature on the subject.

Many of the writers on repeated ectopic gestation have given lists of the cases reported, but most of these are extremely defective. The most complete is that of Haig Ferguson, but even his shows several omissions. As instances of these I may mention the undermentioned in addition to that of my own case:[2]—

Three others, published since his paper was read, also fall to be added, namely, a second case by Ross,[3] a second case by Engström, reported by Lindeblom,[4] and an interesting report of the post-mortem examination of a case by Heinricius and Kolster.[5]

That all cases quoted as repeated ectopic gestations are really such, is, however, doubtful. Two or three, such as Le Dentu's, are more probably cases of twin pregnancy, and, in many instances, the diagnosis has rested on clinical facts alone, and so, though as a rule tolerably certain, definite proof has been wanting. The latter ought to be placed in a separate list. In this category may be mentioned those described by Frommel, Meyer, Kletzch, Winckel, as well as two of Veit's cases, and one each of those reported by Dührssen, Herman, and Zangenmeister.

As regards my case, a full report of it has already been published.[6] I shall therefore give here only an abstract.

CASE 1.—Mrs. B., æt. 33, was seen by me in consultation with Dr. Ritchie on 18th Nov. 1896, and, on the following day, was admitted into the Samaritan Hospital under my care. She had four children, the last born four years previously; labours and puerperia all normal; general health always good; menstruation regular and painless; never any leucorrhœa nor pelvic pain. For seven weeks, from March to May 1896, amenorrhœa with morning sickness and breast symptoms, followed by sudden collapse with cramp-like pains in the abdomen, tenderness more especially in the right iliac region, and uterine hæmorrhage, the latter lasting four or five weeks. Thereafter good health, with no pain and with normal menstrual periods in July, August, and September. Second period of amenorrhœa from 2nd September till 30th October, with morning sickness and breast symptoms. On 28th October, patient fainted seven times, and complained of cramp-like abdominal pains. There was tenderness over the left iliac region, abdominal distension and retching, and on the 30th uterine hæmorrhage set in, and membranous shreds were passed. The bleeding lasted five days, and recurred from the 13th till the 17th of November.

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[1] *Glasgow Med. Journ.*, September 1897.

[2] Purcell, *Brit. Gynæc. Journ.*, London, vol. xlix. p. 32; Byford, *Am. Journ. Obst.*, N. Y., vol. xxviii. p. 269; Savage, *Brit. Med. Journ.*, London, 1892, vol. i. p. 556; Doran, *ibid.*, 1891, vol. ii. p. 789; Bröse, *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xvii. S. 335; Boisleux, *Arch. d'Obst. et Gyn.*, May 1892, p. 197; and Brown, *St. Louis Med. and Surg. Journ.*, May 1850, p. 205.

[3] *Am. Journ. Obst.*, N. Y., Dec. 1898, p. 850.

[4] *Mitth. a. d. gynæk. Klin. d. Prof. Engström*, 1898, Bd. ii. Heft 2, S. 185.

[5] *Arch. f. Gynæk.*, Berlin, Bd. lviii. Heft 1, S. 95.

[6] *Glasgow Med. Journ.*, 1897, vol. xlviii. p. 193.

On bimanual examination, I found the uterus slightly enlarged, retroposed and dextroposed, and, to the left of it, a soft circumscribed mass, of the size of a hen's egg, from the posterior surface of which there extended into the pouch of Douglas a firm mass, of the length and thickness of a man's finger. Pulsation in the left fornix was more distinct than in the right. The sound passed 3½ in.

On the evening of the day of admission two small portions of endometrium were carefully removed by means of a curette, and were found microscopically to contain abundance of decidual cells. On 22nd November, double salpingo-oöphorectomy was performed. The finger-like mass was found to be firm blood clot. Recovery uninterrupted.

The following note of the appearance of the tubes was made immediately after the operation:—"The left tube presents an oval bulging, measuring 3 cms. by 2½ cms., at a distance of 2½ cms. from the fimbriated extremity. At the postero-internal part of this distended portion there is a small rupture of the tube wall, at which part a firm dark red clot, measuring 4½ by 2½ by 1½ cms., adheres to the posterior surface of the tube. The ostium abdominale is closed, but the rest of the tube appears to be normal. The broad ligament is thickened, spongy, and vascular, and the ovary, normal in size, contains several unruptured Graafian follicles and a large corpus luteum. On opening the tube, no embryo is found, but the distended portion is occupied by a tubal mole, as evidenced by the presence of chorionic villi.

"On examination of the right appendages, the portion of the tube removed is found to be 5¾ cms. in length. On the posterior surface, 1½ cms. from its uterine extremity, there is a small rupture of the tube wall, to which is adherent a clot, darker, firmer, and much smaller than that attached to the left tube. It measures ¾ cm. in diameter. The tube at this part is distinctly smaller in diameter, and, on laying it open, the canal is found to be markedly stenosed. On either side the tube seems normal, except that on the upper surface, at a distance of 1 cm. from the ostium abdominale, there is an accessory ostium, surrounded by fimbriæ fully ½ cm. in length. Both ostia are patent.

"The right ovary is normal in size, but to its postero-external surface there is adherent a firm, dark red clot, measuring 3 by 2 by 1½ cms. On removing this clot, it is found to have been protruding from a ruptured cyst, measuring 1½ cms. in diameter."

I have submitted both the specimens to Dr. Teacher, who has kindly examined them. The following is his report:—

Histological report.—To commence with the older conception, that from the right side; as already described by Dr. Edgar, there is attached to the posterior surface of the tube and mesosalpinx a rounded mass, about the size of a pea (8 mm. in diameter), of deep brown colour—to the naked eye a blood clot, and, from the firmness of its attachment, clearly not a recent clot. This was regarded by Dr. Edgar as the remains of an ovum which had developed in the tube, and had burst out of it at the time of the patient's illness in May.

The mass and corresponding length of tube were taken for microscopic investigation, embedded in paraffin and cut into a series of sections transverse to the tube.

The ovary was also sliced in search of a corpus luteum, and one slice embedded and cut. The sections of the latter show Graafian follicles in various stages of development, several cicatricial bodies representing old follicles (the false corpora lutea of Dalton), and a cyst which had been torn open and had collapsed. This measured about 15 mm. in diameter. It has a wall from 1 to 1·5 mm. thick, composed of rather acellular fibrous tissue loaded with orange-coloured pigment (hæmatoidin). It may be the remains of an old corpus luteum, but no trace of the characteristic cells remains.

Of the tube and mass numerous sections, taken at different points of the series, were finished for examination. They show the mass attached to the tube to be a nodule of somewhat fibrous granulation tissue, evidently of considerable age, intimately united with the tissues of the tube and mesosalpinx.

It owes its dark brown colour to the presence of enormous numbers of granules of orange-coloured pigment, mostly contained in the cells, a considerable proportion of which are more or less loaded with it. There are also in places, lying free among the fibres, a number of the characteristic rhombic crystals of hæmatoidin, which indicates the source and nature of the pigmentation. The nodule is clearly an old blood clot almost entirely replaced by new formed cellular tissue. There is no free fibrin remaining.

The pigmented cells are larger than the unpigmented ones, of various shapes, mostly oval, mononucleated, and look like connective tissue cells distended by the pigment which they had taken up. The nuclei can be seen through the granules well stained even in the most deeply pigmented cells. The tissues of the tube and mesosalpinx adjacent to the nodule are infiltrated with the pigmented cells (mostly very deeply pigmented ones), and these cells occupy the interstices between the bundles of fibrous tissue, and especially spaces along the sides of the blood vessels, which appear to be lymphatics.

There are also to be seen in the nodule remains of chorionic villi, chiefly in the form of masses of syncytium, which will be described after the condition of the tube has been indicated.

The tube on both the distal and the proximal side of the nodule shows most of the characteristic features of the normal tube. There is the usual greatly folded mucous membrane, covered with columnar ciliated epithelium; the cilia are not well preserved, but they are present —the fixation of the tissues as a whole is not all that could be desired. The fibrous and muscular wall is considerably thickened, and contains numerous and large blood vessels, as has been observed in a number of pregnant tubes. Passing along the series of sections towards the middle of the nodule, it is noticed that the thickness of tube wall separating the pigmented granulation tissue from the lumen rapidly decreases, and the lumen itself gets gradually narrower, and the folds of its mucous membrane much fewer and smaller.

Then at the one side the pigmented cells appear in the mucous membrane, and a little further on the granulation tissue is separated from the lumen by only a single layer of epithelium, which has become flattened, or its surface lies naked in the tube. A few sections further on the lumen has become very small, shows the folded mucous membrane only on one side, and consists mostly of narrow clefts in the granulation tissue. Finally, the lumen is represented by these clefts only with a small amount of what seems to be coagulated mucus in them. The granulation tissue occupies and has obliterated the tube, with the exception of these clefts and one or two small recesses in the opposite wall of the tube, either communicating with or quite shut off from the clefts, in which are seen remains of the tubal epithelium. Such recesses are frequently seen under the attachment of a tubal placenta to the tube wall.

It is about this part that the placental remains are most abundant, though they are observed more or less all along the zone of attachment of the nodule to the tube wall.

Here there are found numbers of typical giant cells and other still larger masses, the nature of which was not made out in the first sections examined. On account of the giant cells, though the arrangement of the tissues in general did not in the least suggest tubercle, sections were stained and examined for bacilli, with negative result.

Of the other objects, the most characteristic forms, and those from which their nature is made out, are long narrow crescentic bodies; a few complete circles are also found, and numbers of irregularly shaped masses. They are stained diffusely of a bluish grey colour (hæmalum and eosin staining), are rather granular, their edges rather ragged and eroded-looking for the most part, and they contain numbers of clear, oval, or round bodies, some very lightly stained blue, which are distinctly recognisable as the remains of nuclei. Some of the masses show, united with their concave borders, the remains of a layer of epithelium-like cells, and one or two of the circles also show a fibrous core, quite unlike the tissue outside, but like that which forms the core of the chorionic villus. The masses were clearly made out to be the necrosed remains of the syncytium of chorionic villi, with Langhans' layer and the fibrous core clearly identifiable in a few cases. The giant cells are seen only in the neighbourhood of these structures.

They lie usually in contact with the masses of necrosed syncytium, sometimes outside (*i.e.* on the convex side of the crescent), sometimes inside them. In one or two cases the somewhat ragged edges of the syncytium, about the point of contact with the giant cell, have a peculiar loose granular appearance, as if undergoing a process of breaking down or solution. No decidua cells are present. There are no remains of tube wall over any part of the exterior of the clot.

There is no doubt, from the appearances above described, of the presence in the nodule of placental remains, the elements of which, in varying degrees, have survived for about six months in recognisable condition in the living body, in the midst of organising elements, which had completely broken down and mostly removed the fibrin and corpuscles of blood clot.

Sections were also prepared from the upper part of the ovum in the left tube, from portions of the tube proximal and distal to the ovum, and from the ovary, which contains a large corpus luteum. The sections of the ovum show altered tube wall, chorionic villi, chorion and amnion. The villi are attached to the naked fibrous tissues of the tube wall; no trace of tubal epithelium is seen where there are villi. In parts the tube wall is thickened, but at one point it is extremely thin, appearing to be just on the point of rupture over the attachment of a villus. The tube wall, especially towards its inner aspect, is full of large cells, lying between the fibrous bundles; these cells somewhat resemble decidua cells; they are not quite so regular in size and shape, nor so well defined, as the typical decidua cell, nor have they such granular protoplasm; they resemble various of the intermediate stages between the connective tissue cell and the decidua cell which are seen in young decidua.

In the sections of the tube proximal to the ovum there is no marked abnormality, except that the cilia could not be made out; whether this is a matter of disease or of preparation, is hard to say—there is some remains of blood in the tube which would tend to obscure them.

They are present in the distal segment over some parts of the folds. In neither situation is there any shedding of the epithelium, nor change of the mucous membrane in the way of containing large cells like those in the pregnant part of the tube. There are a few leucocytes in the mucous membrane and in the lumen of the tube, but it is questionable whether they are entitled to be regarded as evidence of salpingitis.

This report is extremely interesting. It affords indubitable evidence that the case is one of repeated tubal pregnancy, and describes with great precision the appearances in an ovum which has been undergoing absorption for a considerable period of time. Attention should also be directed to the absence of decidual cells in the right tube, the presence of cells apparently allied to them in the left tube, and the absence of definite signs of salpingitis in either. There are several points about this case which may be noted—

1. *The fact that rupture occurred in both tubes*, the first at the end of the seventh, the other at the end of the eighth week.

2. *The very small amount of blood extravasated intraperitoneally on each occasion.*—Examination of the tubes, subsequently to the operation, showed that this was due to plugging of the rents by blood clot.

3. *The seven attacks of syncope at the time of the second rupture.*—As so little blood was extravasated, these must have been due to the shock of rupture and not to the hæmorrhage. In my experience, syncope is more apt to supervene in tubal rupture than in tubal abortion, but little dependence can be placed on this sign in differential diagnosis. In one case, with the largest rent I have yet seen, one almost circular and measuring 1 in. in diameter, there was no syncope.

4. *The presence of decidual cells in the two portions of endometrium removed by the curette.*—If found in abundance, these are valuable as a sign of pregnancy. It is, however, seldom necessary

to resort to curettage in the diagnosis of ectopic gestation, and the danger of setting up fresh internal hæmorrhage must be kept carefully in mind. No force should be used, the uterus should be simply steadied and not pulled down by the bullet-forceps, and every antiseptic precaution should be employed.

5. *The absence of any history of pelvic pain or other sign of tubal disease prior to the tubal pregnancy, and of any definite microscopic evidence of salpingitis in either tube.*—There were a few loose adhesions present, but these were undoubtedly the result of the extravasation of blood. From a study of this case and of several others, I have come to the conclusion that tubal disease is not an essential cause of ectopic gestation.

6. *No preceding sterility.*—The patient had had four children previously, the last three and a half years before the first tubal pregnancy. Far too much prominence is given in the text-books to preceding sterility. In my experience the reverse is the rule. Of twenty-six cases under my care, almost every patient has had a child a few months or a year or two previously.

7. *The successful recovery after the first rupture.*—There was no subsequent pelvic pain, nor any abnormality in the menstruation, and the microscopic examination of the tube showed that nature was overcoming the local disturbance. This opens up the question, which is too large to be discussed in this paper, whether the usual advice, that all cases of extra-uterine pregnancy should be operated on, is wise. I have already referred to this in my paper,[1] and lately Veit has discussed the matter fully,[2] and has declared himself in favour of non-interference in certain varieties of cases.

In conclusion, I desire to dissent strongly from the view, held by Reed, Dorland, Haig Ferguson, and others, that in all cases of tubal pregnancy, the other tube, whether diseased or *apparently healthy*, should be removed at the same time, on the ground that it may subsequently become gravid. The admitted rarity of repeated ectopic gestation makes such an event extremely problematic. Such being the case, we are surely not justified in rendering our patients sterile. Many cases of normal confinements, subsequent to the removal of gravid tubes, have been recorded. I myself have had two cases of this kind.

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[1] *Glasgow Med. Journ.*, 1897, p. 264.

[2] *Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xl. Heft 1.

OBSERVATIONS ON LABOUR, COMPLICATED BY A MINOR DEGREE OF PELVIC CONTRACTION IN PRIMIPARÆ AND MULTIPARÆ.[1]

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I SHALL preface what I have the honour to say to you to-night, by a statement of the case which specially illustrates some of the points I wish to bring before you. I have attended the patient through five consecutive confinements, and her obstetric history is as follows:—

CASE 1.—Mrs. X., æt. 33, is an exceedingly healthy and apparently well-developed woman, somewhat inclined to *embonpoint*. Her *first* child, a large male nearly 9 lb. in weight, was born in April 1888. The head lay normally in the pelvis, and, as is usual in primiparæ, it had passed through the brim some weeks before the commencement of labour, and it lay in the pelvic cavity when the first stage set in. I applied forceps, owing to rigidity of the perineum, and to prevent inertia. The child was born without great difficulty, and was alive and well.

The *second* child, a girl between 7 and 8 lb. in weight, was born in March 1890. At the commencement of labour, the head (a normal vertex position) was not through the pelvic brim, but was fixed there. The membranes ruptured early, and as the result of the strong pains the head rapidly passed completely through the brim. The rest of the labour was simple, and forceps were applied on the perineum. The child was healthy and well.

The *third* child, a large male between 8 and 9 lb. in weight, was born two years later (in 1892). The membranes ruptured early, and the head was freely movable at the brim and never engaged, lying transversely with the occiput to the left. The labour pains were strong and vigorous, but they produced no effect on the progress of the head, and ultimately signs of inertia began to manifest themselves, the head remaining loose above the brim, and the cervix fairly well dilated. I tried to apply forceps, but on every occasion they slipped off the head, and unfortunately I had not very efficient assistance. Ultimately I performed podalic version. The head came through the brim with very considerable difficulty. Vigorous suprapubic pressure at last proved effectual, and it slipped into the pelvic cavity with a jerk, and was afterwards easily delivered. The child was dead, and its posterior parietal bone showed evidence of the pressure of the promontory.

Eighteen months later (in 1894) a *fourth* child was born. During this pregnancy I had proposed the operation of induction of premature labour, but the patient was averse to such interference, and I did not insist, as I hoped that, as she was now 30 years of age, her children would be getting smaller (as one knows they do get lighter and less bulky, though longer, after that age), and thus allow of an easier labour. In this, however, I was disappointed, as, though it was again a normal vertex position, the membranes ruptured early and the head did not engage; I managed with difficulty to pull it past the obstruction with forceps. The child (a female) was a large one, nearly 8 lb. in weight, and had a somewhat firmly ossified skull. It was still-born (pallida), and could not be resuscitated, in spite of every effort.

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[1] Read before the Edinburgh Obstetrical Society, May 1899.

The *fifth* child (a male) was born in August 1897. There was some doubt as to the exact date when pregnancy began on this occasion, and no very definite data to go upon for the induction of premature labour, which was still strongly objected to. Pregnancy went on to full time, and the same phenomena occurred. The membranes ruptured early, the head (L. O. A. position) did not engage, but lay transversely at the brim, and the labour pains served only to exhaust the patient without producing any effect. I allowed the natural efforts to continue as long as it was safe, and until the cervix was dilatable. I then applied forceps, with the kind assistance of Dr. Arthur Wilson, and pulled the head through the brim very gradually, allowing plenty of time for moulding to occur. The child was still-born, but was easily resuscitated, and did well. It weighed close upon 8 lb.

Now, here is a patient who has had five labours at full time. Her first two labours were comparatively easy, and her last three were all difficult, from disproportion between the head and the brim of the pelvis. All the labours were vertex, and there was no malposition of the head. The heads were all large, but none of them unduly so, or too firmly ossified, at least to any serious extent, and there was no fœtal complication or deformity. The uterine contractions were in all cases vigorous and regular, and there never was any appreciable deviation in the axis of the uterus. The membranes ruptured early in all except the first labour, but the cervix in each case was soft and easily dilatable, and offered no obstruction. The difficulty clearly existed at the brim, and only at the brim, and was due to a contracted conjugate. The pelvis is, in fact, a non-rachitic flat pelvis, and the conjugata vera measures just over 3½ in. The patient gives a history of carrying heavy weights as a child, in the shape of some of her own nephews and nieces who were not much younger than herself, and whom she was very fond of carrying whenever she got the chance, and in spite of orders to the contrary.

Why, however, should the first two labours have been comparatively easy, and the last three have been so difficult? Clearly, if we eliminate the causes above mentioned, which were non-existent in this case, this must be accounted for in one of two ways, either that the pelvic contraction is an increasing one, or that the fœtal head is at fault.

It is perfectly clear that there has been no increasing pelvic contraction. There is no osteomalacia, or other disease of the pelvic bones or joints; the patient has no hard manual labour, and is not now in the habit of carrying heavy weights on her head or otherwise; the cavity and outlet of the pelvis are roomy and commodious; the conjugata vera, as we have seen, is alone affected, and there is no asymmetry.

On the other hand, the fœtal head was, in each case, practically a normal one. As we have seen, it was never unduly large or over-firmly ossified; and, further, the heads of the first two children were in no way markedly smaller than those of the subsequent three, and yet practically no difficulty occurred with them. Unfortunately, I have no accurate measurements of the heads after birth, but there can be no doubt that the head of the first child was quite as large as any of the heads of the subsequent children, and there certainly was no tendency to increase in size of the fœtal head in the successive labours. Probably the fifth child's head was, on the whole, smaller than those of the previous ones. How, then, are we to account for this apparently anomalous obstetric phenomenon—that the two first labours were comparatively easy, and the three subsequent ones so difficult? One is in the habit of thinking that, given as nearly as possible similar conditions, with no complications, maternal or otherwise, and if the fœtal head has shown no disproportion to the pelvic brim in a first labour, no great difficulties are to be anticipated in subsequent labours. Now, this case goes to show that this is not always so. Of course, the character of a labour depends upon many things altogether independent of the size and shape of the pelvis, and multiparæ are certainly more exposed to certain complications which may retard labour than are primiparæ. In Mrs. X.'s case, however, no complications existed in her subsequent labours.

I would venture to submit the following explanation:—It is a well-known fact that in a primipara the normal position of the fœtal head in the last month of pregnancy is in the cavity of the pelvis. The head has been forced through the pelvic brim by the firm abdominal muscles and uterus, stretched now for the first time, and the lower uterine segment is greatly distended as a consequence. Now, in Mrs. X.'s case, the muscles are particularly strong and well-developed, with very firm abdominal walls, and a short waist. The result was that, in her first pregnancy, the fœtal head was pressed through the brim about the beginning of the last month, and then developed to its full size in the pelvic cavity. In fact, nature herself had acted on the principle on which we act in the induction of premature labour, and had secured the passage of the eighth-month pliable skull through the narrow brim. Such a possibility could only be possible in a comparatively minor degree of pelvic contraction, sufficient to allow of an eighth-month fœtal skull passing through the brim without much difficulty. In this case, when the head passed through the brim, all mechanical difficulty was over. In a justo-minor pelvis, on the contrary, the head can enter the pelvis, but cannot easily pass through, so that dystocia exists during the whole passage of the head. This explanation would, however, hardly account for the all but natural termination of labour No. 2. It is to be noted that Mrs. X. was a particularly muscular and firmly built woman. This is shown by the fact that, in the second labour, the fœtal head did not lie loose above the brim, and though not through, it was fixed there. The child was a female, and weighed less, consequently its head was probably a little smaller, and possibly more easily moulded. The uterine contractions were strong and vigorous, as one would expect in a healthy, muscular young woman, the tonicity of whose uterus and abdominal muscles had apparently suffered in no way from her previous pregnancy and labour. The head was, in consequence, subjected to such an amount of pressure, that it gradually moulded and was driven through the brim in the proper axis, the rest of the labour presenting no difficulty. In the subsequent labours the head lay loose above the brim, and consequently was not acted on to the best advantage by the pains. Further, the pains were less vigorous than they were in the first two labours, and though there was no pendulous belly, the abdominal muscles were undoubtedly more relaxed. As a result, no moulding of the head took place, and no progress. As the labour went on, the head continued to remain loose above the brim, and showed no tendency to enter the true pelvis by the time symptoms of exhaustion began to manifest themselves. I think I have seen at least one other case exhibiting similar phenomena, and where the above explanation seems the only possible one. I have, however, not had an opportunity of seeing so many consecutive labours in this second case, or of eliminating entirely other possible causes of delay.

Ahlfeld[1] has lately laid down the axiom that forceps should never be applied till the head has entered the pelvic cavity, and should be removed before the head is past the vulvar orifice. With the latter part of the statement I am inclined to agree, but I believe much of the advantage of forceps would be lost if the former part were always acted on. True, one would be only too thankful to have the head in the pelvis in all cases before applying forceps; but I contend that, in many cases, no engagement will take place, and no advantageous head-moulding will occur, without the help of forceps, when the head is loose above the brim in a moderately deformed flat pelvis. I am, of course, not referring to the condition of the cervix in relation to forceps in such cases; believing most strongly that the head should never be pulled through a cervix not fully dilated, but that the cervix must, in all cases, first be carefully pushed back over the head. So long as the head is not engaged after the rupture of the membranes, the powers of labour act at great disadvantage, and are comparatively, if not entirely, ineffcacious, while none the less exhausting to the patient. As soon as the head engages, not only do the powers of labour then act with advantage, but the head at once moulds itself in accommodation to the pelvis. In such cases one should secure engagement as quickly as possible, and I believe, in minor degrees of flat pelvis, this can best be effected by an early application of forceps. As Milne Murray[1] has pointed out, the antero-posterior grip of the head in such cases results, not in transverse bulging, but in elongation of the head in a vertical direction. The rationale of forceps in such cases is practically the same as that of version, and forceps is certainly more applicable in slight degrees of contraction. The point is, that once *engagement* is secured in such cases there is no call for hasty delivery. Ample time should be given either by nature's efforts or by prolonged intermittent forceps traction, to allow moulding to take place gradually. Many of the failures and fœtal deaths with forceps are due to a forgetfulness of this fact, that the fœtal head cannot be pulled through the narrow pelvis safely, if at all, until gradual moulding has taken place. Many of us are familiar with the fact that after one man has spent a long time in endeavouring to deliver a fœtus with forceps, and has sent, exhausted and discouraged, for a second practitioner to help him, No. 2 often succeeds with apparent ease in delivering the fœtus at once. But the secret of No. 2's success lies in the fact that the previous intermittent traction, followed by a period of cessation while practitioner No. 1 awaited the advent of No. 2, has allowed moulding of the head to take place, and consequently of easy delivery. If engagement is not secured early in the second stage, the patient gets exhausted, no progress is made, and the chances of delivering a living fœtus become small, not to speak of the risks to the mother. On the other hand, if the head is engaged early, as is usually the case in a justo-minor pelvis, allow nature to go on as long as it is safe before applying forceps. Given good pains, no insuperable obstacle, and no exhaustion of the mother's strength, nature's efforts all tend to mould the head through the pelvis and render subsequent delivery with forceps, should it be required, all the easier and safer both for mother and child.

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[1] "Lehrbuch der Geburtshulfe," 2nd edition, Leipzig, 1898.

Pinard[2] has recently stated that the average weight of infants born to women with contracted pelves is greater than that of those born to women with normal pelves. The reason being, that in deformed pelves the uterus and presenting part are prevented from sinking into the pelvis towards the end of pregnancy, and that labour in consequence, if not delayed, is at any rate not premature, as he seems to think it is apt to be when the presenting part is in the pelvis. In 100 cases of symphyseotomy for contracted pelves he found the average weight of the newly born child was 3350 grms. (7·4 lb.). If this is the case, a new element of difficulty has to be reckoned with in pelvic deformity, for not only is there the contracted pelvis, but the fœtus is above the average size (and apparently the greater the contraction the larger the fœtus). This would clearly chiefly affect multiparæ, if the deformity of the pelvis were such as to allow in the first pregnancy of the fœtal head sinking through the brim in the last month as it does in the normal pelvis, and would tend to make subsequent labours more difficult than the first in such cases. Further observation is however needed on this point.

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[1] *Trans. Edin. Obst. Soc.*, 1887–88, vol. xiii. pp. 206–214.

[2] *Ann. de gynéc.*, Paris, Aug. 1898.

Franke[1] has made an elaborate analysis of 610 labours with contracted pelves. These cases occurred during a period of eighteen months, out of a total of 2512 labours, attended during that period in the obstetrical clinique at Dresden, under Professor Léopold. Out of those 610 labours with contracted pelves—

Four hundred and twenty-four, or 69·5 per cent., were delivered spontaneously; of these, 194 were primiparæ and 181 were multiparæ. Forty-nine cases were deducted from this list of spontaneous delivery, as in them the fœtuses were so small as not to count. (Where the weight of the child is less than 5½ lb., and its length less than 19 in., it is so small that minor pelvic contraction does not interfere with spontaneous delivery, and no difficulty arises.) One hundred and forty, or 22·95 per cent., of Franke's cases were delivered by operations; of these, eighty-nine were operated on for pelvic contraction alone, thirty-four being primiparæ and fifty-five multiparæ. Forty-six,[2] or 7·53 per cent., were delivered by the colpeurynter.

Out of 464 cases, therefore, where no complication existed but the deformity of the pelvis, there were 228 primiparæ and 236 multiparæ, almost equal numbers; and it is interesting to note that in those delivered spontaneously, there are more primiparæ than multiparæ (194 to 181), while in those delivered by operations for contracted pelvis alone, there are more multiparæ than primiparæ (fifty-five to thirty-four).

Franke found, further, that in forty-one cases, out of the 194 primiparæ who were spontaneously delivered, the head was still movable at the beginning of labour in the upper strait, or above it; in the others, the head was fixed, but whether before or after labour could not be determined in every case, as many cases came under observation for the first time in an advanced stage of labour. All Franke's primiparæ were young and vigorous, the youngest 15 and the eldest 36.

Franke's statistics show that 59·2 per cent. of the deformed pelves were generally contracted, and 27·4 per cent. were simple and rachitic flat pelves. Other statistics (*e.g.* Gönner and P. Müller) make the flat pelvis the more common.

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[1] "Accouchement spontané et accouchement artificiel dans les bassins rétrécis," *Ann. de gynéc. et d'obst.*, Paris, 1895, tome xliii. pp. 34–50.

[2] These are not divided into multiparæ and primiparæ.

r number of Franke's cases which were ly had generally contracted pelves.

women in labour in the obstetrical clinique at less contracted pelves.

d that in 200 cases of normal pelves, including d multiparæ, the head was in the pelvis before r cent.

f contracted pelves he only found the head in the times, *i.e.* 8·1 per cent., and in these the entrance was only partial at the end of pregnancy.

our with narrow pelvis the head entered the pelvis aters broke, in a quarter of the cases, or 21·4 per cent.; ter full opening of the cervix in more than half the er cent.

e's statistics seem to indicate that (at least in his series of ore primiparæ than multiparæ are delivered spontaneously of contracted pelves, after eliminating altogether other n delay not directly due to the pelvic condition, which one re more apt to exist in multiparous labours.

s is no doubt due to the stronger pains, to the early engagement of the presenting part, to the possible absence of any great e obliquity, and to the possible smaller size of the child in paræ.

It would be interesting, however, to have more statistics as rds labours in the same patient with slight pelvic deformity, a general classification of a more or less contemporaneous set cases gives little information in reality, as every patient must e considered individually, not only as regards the pelvic condition, ut as to the characteristics of each consecutive labour that she has had, before anything like a useful classification can be made. This cannot so easily be done in hospital practice (where a patient is often only seen once by the physician in charge and is then lost sight of) as in private practice. Possibly, however, opportunities for such observations may be rarer now than formerly, as large families are apparently not so common now as they used to be.

THREE CASES OF URETERAL CALCULI IMPACTED IN THE LOWER END OF THE URETER, AND REMOVED BY SUPRAPUBIC CYSTOTOMY.

By E. STANMORE BISHOP, F.R.C.S. Eng., *Hon. Surgeon, Ancoats Hospital, Manchester.*

URETERAL calculi are not extremely frequent. If a renal stone small enough to pass into the ureter, in the majority of cases i next place of lodgment is the bladder. Occasionally, howeve

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[1] "Geburt bei Engen Becken," Leipzig, 1884.

stones do become impacted in this tube, and if they do, and are not soon removed, the consequences are extremely serious. If the impaction is double, *i.e.* on both sides, anuria results, with death on or about the thirteenth to the twenty-first day. If single, and the impaction is absolute, intense pain, followed by atrophy of the corresponding kidney, occurs. If the impaction is not complete, or is shifted from time to time, hydronephrosis, with intermittent attacks of renal colic, possibly pyonephrosis or pyonephric abscess, with their concomitants, are the result.

Their removal, however, until within the last twenty years, had not been attempted, although in 1851 Velpeau suggested it. Dr. Thomas Emmet of New York, in 1879, mentioned in his work on gynæcology, three cases of removal of calculi from the vesical end; one not operated upon, one removed by incision through the vagina, and one through the bladder, all in women. Since that date, other operators, Bardenheuer, Fenger, Ceci, Henry Morris, Knowsley Thornton, Godlee, Lane, Tuffier, and Twynam, have all removed calculi from various parts of the ureter, with more or less success.

Calculi tend to lodge in one of three definite positions. First at the infundibulum; secondly, just about the brim of the pelvis; and thirdly, at the vesical end. They have, however, been found in other portions of the tube. The great majority, according to Morris,[1] are found at the upper end of the ureter.

It is easy to understand why these three spots should be most commonly chosen. The funnel-shaped end of the infundibulum is especially likely to be blocked by a calculus large enough to enter its upper wider portion, but too large to pass down its undilated calibre. Driven onwards by the pent-up secretion behind, and unable to advance, it is almost certain to impact itself. Sometimes, however, if rounded, it acts as a ball valve, permitting fluid to escape below it, and a change of position of the body may shake it back again into the renal pelvis. At the brim of the pelvis, the ureter makes a bend forwards from the loose tissue over the loin muscles, so as to describe a serpentine curve over the iliac crest. Whilst fluid will easily find its way through this curve, it is quite otherwise with a solid mass. The lower pole will strike the anterior wall of the tube, being thereby checked in its forward movement. The force of the posterior pressure of the urine, previously acting upon its upper pole, now is shifted towards its centre,—it will be noted that, as in the accompanying figures, most of these stones are elongated cones—and the upper pole is thereby driven against the posterior wall, still further obstructing its advance. Fresh crystalline particles are deposited upon its rough surface, and the narrow chinks through which urine could at first find its way become closed.

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[1] Hunterian Lectures, p. 122.

The vesical orifice is also easily blocked. If a stone has been small enough to find its way through the normal or slightly dilated ureter up to this point, it meets here with a still narrower passage. Moreover, the canal here is valvular, and is surrounded by stronger muscular fibres than those present in the wall of the ureter itself. The irritation caused by the passage of a rough substance sets up a reflex contraction of these fibres, which still further contracts the narrow passage in which it lies. If the stone is small *and short*, their contraction may force it through, at the risk of more or less damage to the internal orifice. If longer, as in Cases 2 and 3, the force of these fibres will be expended more towards its retention, since they do not get behind its main bulk.

When once a stone is retained in this position, it would appear that one of two things will happen. Should the point project into the bladder and be rough, fresh salts are deposited upon it from the urine present in that viscus coming from the other kidney, as is well shown in Case 1, and in the little cap in Case 3. If, on the other hand, it be smooth, and its end flush with the bladder, as in Case 2, it appears to be subjected to a washing process, which gradually removes the smooth surface, probably later to be the centre of fresh crystallisation.

The three specimens were all obtained from this situation, and were all removed by suprapubic cystotomy. Two occurred in males, and one in the female.

Case 1.—R. S., male, æt. 13.—The notes of this case are imperfect. He entered Ancoats Hospital, July 1893. Had complained for a long time of symptoms indicating vesical calculus, and was sounded with that idea. The stone was easily felt, but appeared more fixed than normal. It did not alter its position when the patient's own position was changed. Suprapubic lithotomy was done, and the stone removed by the finger, aided by a small Volkmann's spoon. The stone was, as shown in the figure, like a small wheat-sheaf, the stem of which was fixed in the ureter, the larger head projecting into the vesical cavity. It was composed of a centre of urate of ammonia, surrounded mainly at the head by spiculate crystals of calcium oxalate. The wall of the bladder was stitched to the skin. Healing was complete by September, and he was discharged well; passing all urine per penem, and able to retain and expel his urine normally. I have tried to trace him, but without success. I hear, however, that he has been seen pushing a cart within the last few weeks, and that he has never suffered from any return of calculous symptoms.

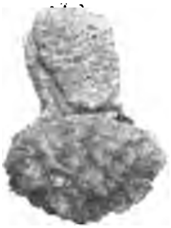

Fig. 1.

Case 2.—Mrs. R., æt. 35.—Menstruation commenced at 15 years, and was regular up to July 1897, when both her ovaries and tubes were removed by a surgeon in the country. Has been married thirteen years; no children or miscarriages. Sent to me by Dr. Knapton of Manchester in March 1898. When 13 years old, two years before menstruation began, pain commenced in the left side, and was very severe during these two years. After menstruation began, the pain, however, became exacerbated at the periods, and this, no doubt, accounts for the diagnosis which resulted in excision of the ovaries in July. Complete suppression of urine took place when patient was 22, thirteen years ago, preceded by much more frequent attacks of pain. Some operation, the nature of which I have been unable to ascertain, was done in Bradford Infirmary, by Dr. Meade, the result of which was that urination again became possible. For a few weeks the pain was relieved, but attacks have recurred more or less ever since. When a paroxysm comes on, it starts below the left ribs. There it may remain, in which case it is bearable; sometimes it passes down in the line of the ureter, shooting to the pubis and down the left thigh, also upwards to a point behind and below the eleventh rib, when it becomes unbearable. The urine sometimes becomes scanty before the onset of pain, sometimes will pass until the pain becomes severe. During the paroxysm, has constant wish to pass urine, and will strain to do so, without any result. The urine would pass and pain disappear almost together. Sometimes a little urine would pass with intense pain, so that she dreaded to urinate. Then after disappearance of pain, urine would pass four to five times in half an hour. This always meant relief. She would be able to go about in an hour or two, and would be free from pain for a week to a fortnight. Five weeks ago had the longest and severest attack she remembers. The longest attack, though not the most painful, was for three days, 18th to 20th March 1898 inclusive. Often feels quite well on rising. Is always easiest when lying flat. About 10–11 A.M. a feeling of weakness in the side comes on, with aching pain, which gradually becomes acute. Previously, sometimes, if she immediately lay down, this would pass off; does not do so now. She is in most pain if she lies on the right side.

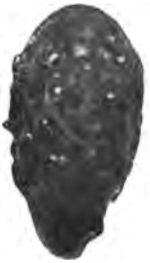

FIG. 2.

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27*th March* 1898.—Thin, worn-looking woman, with expression denoting past experience of pain. There is pain on pressure over the left kidney; no swelling or palpable enlargement; no pain on the right loin. Lloyd's test gives affirmative result on left side. Urine contains albumin, hæmocytes, and crystals of calcium oxalate.

Per vaginam.—Nothing can be felt but a small uterus, which is somewhat drawn to the left side; the right tube being apparently on the stretch, can be felt as tense band.

Per rectum.—Below and to the left of the uterus is a small hard fixed mass in the line of the ureter. A diagnosis of impacted ureteral calculus was made. On 30th March the urethra was dilated, and the finger introduced. The rough end of the calculus could be felt, but the stone itself could not be moved. Suprapubic cystotomy was at once done, and the left ureter slit up for a short distance upon the stone, which was removed, and the bladder and abdominal wall closed Calculus oxalate of lime covered by hæmatin, weight 100 grs. Absolute anuria up to death, forty-eight hours after. No post-mortem allowed.

Points worth notice—

1. The fact that this condition may be confounded with ovarian disease. The diagnosis, I think, rests upon—(*a*) The existence of the attacks before menstruation commenced; (*b*) the behaviour of urination during the attacks; (*c*) the microscopical appearances in the urine; and (*d*) the recto-bimanual examination.

2. That although the stone was impacted in the vesical end of the ureter, and therefore it was to be expected that it would be easily discovered by the vagino-bimanual examination, it could not be felt in this way, whilst it was easily defined by the recto-bimanual exploration.

3. It may be noted that the practice of so specialising diseases of women that all one's attention is directed to the uterus, ovaries, and tubes, is liable to the possibility that the diseases of neighbouring structures equally important may be overlooked or ignored. Quite recently, I have seen a case of tubercular bladder, in which the ureters were greatly thickened, and had been diagnosed as enlarged Fallopian tubes, which, indeed, they greatly resembled.

CASE 3.—T. H., æt. 7, admitted 21st November 1898, came to hospital complaining of pain on urination, with difficulty. Pain at end of penis, which, he says, has been present since he was a baby. Has been sounded twice for stone, but none found. Urine acid, 1018; no crystals, but some leucocytes.

13*th December.*—Has had no pain, undue frequency or difficulty in urination since entering the hospital. Examined under ether. Vesical calculus found.

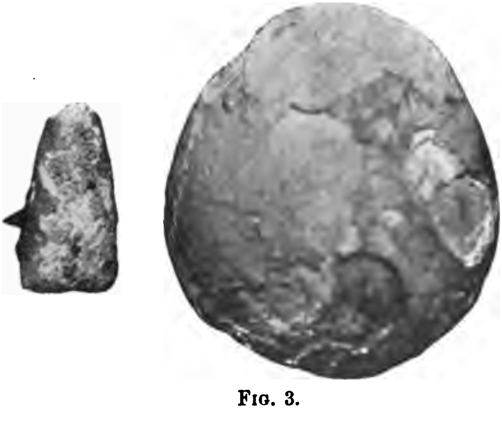

FIG. 3.

17*th December.*—Suprapubic cystotomy. Calculus removed, weight 2 oz.; bladder washed out; some fragments chipped off in removal; bladder wall united; abdominal opening closed; celloidin dressing. Temperature rose to 100°·2 same night; came down to normal next day. On the 20th rose to 102°·6, when sutures were removed and about 6 oz.

of pus let out from beneath muscles; the urine was found to be alkaline, and salol was given; urine escaped by suprapubic opening twenty-four hours after.

On the 26th, eight days after operation, began first to complain of pain in the region of the right kidney; had short, dry cough; but no physical signs of any chest complication; the right leg was flexed, and there was complaint of abdominal pain. On the 27th, 28th, and 29th there was intense spasmodic pain—renal colic. The temperature reached 104°·2 on the 26th, and varied from 100° to 102° during the four succeeding days. Thinking that there might be a secondary accumulation of pus in the cavum Retzii, an examination was made per rectum. Nothing was found there, but a hard fixed body was felt on the right side at the base of the bladder, and an impacted ureteral stone was diagnosed.

On the 30th the wound in the bladder was opened up, and whilst Dr. Jackson, our senior house surgeon, fixed the stone by pressure from behind with his finger in the rectum, the stone shown was teased out from above. A gush of pus, evidently from the right kidney, followed its removal. The temperature immediately began to fall, and reached 99° only two days after, from 103°·2 at the time of operation; is taking salol and quinine.

1*st February.*—Urine is acid; boy is very thin, but eating well; temperature has reached 100° on three occasions, but is now normal; all urine, which still contains a little pus, passes by suprapubic opening. Patient was sent to Southport to recruit before an operation to close this, which is in prospect.

These cases also involve the question as to the best mode of attack in impaction at the vesical end of the ureter. Henry Morris,[1] Cabot,[2] Hurry Fenwick,[3] and Emmet advise removal through an incision through the vaginal roof in the female. Richmond and Knowsley Thornton dilatation of the urethra, and removal through this. Hurry Fenwick (*loc. cit.*) advises removal in the male through a transverse perineal incision. Removal through the rectum has been advised by some authors.

Vaginal opening was rejected in the second case, since, as already stated, the stone could not be located through this passage. The difficulty of removal through a dilated urethra is well illustrated by a case of Thornton's, quoted by Jacobson,[4] in which a ureteral fistula resulted, and the urine flowed into the pouch of Douglas, with the result of mania and death a fortnight afterwards. Cullingworth opened the abdominal cavity and removed a stone through the peritoneum, much pus and urine escaping from the dilated ureter. Death ensued from peritonitis between the third and fourth day.

Removal through the rectum has so many and such obvious objections, amongst which the most important is, without doubt, the immediate entrance of the colon bacillus into a dilated ureter, communicating directly with a damaged kidney, that under hardly any circumstances could it become advisable.

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[1] Hunterian Lectures, p. 121.

[2] *Am. Journ. Med. Sc.*, Phila., 1892, vol. i. p. 51.

[3] *Edin. Med. Journ.*, March 1898, p. 281.

[4] "Operations of Surgery," p. 747.

If, in the female, a stone can be well defined through the vaginal roof, removal in this direction would seem to be preferable, since a larger extent of the ureter is available for division without risk of opening into the peritoneal cavity. Moreover, drainage is more direct, and in the right direction; but if this is not practicable, as in my case, and in the male, the readiest and safest route would appear to lie through the bladder. When the bladder is open, and the patient in the Trendelenburg position, any work can be carried out with the utmost ease and precision, especially if the base of the bladder is raised by pressure from within the rectum. The mode of entrance of the ureter into the bladder necessitates the presence of a certain thickness of vesical fibres between the vesical and peritoneal cavities, which may safely be divided without risk of opening up the latter; and inasmuch as the stone is usually retained only by the few last surrounding the extreme orifice, it is not necessary to divide many before the calculus is sufficiently loose for removal. The extent of division necessary may also be much more easily determined upon, and more neatly executed, than when approaching it in any other direction.

PARTIAL RETENTION OF URINE: ITS CONSEQUENCES AND TREATMENT.

By A. A. Warden, M.A., M.B., C.M, *Resident Surgeon, Hertford British Hospital, Paris.*

"Nombre de malades vous parlent de pesanteurs stomacales, de constipations opiniâtres, de vomituritions, voire même de diarrhées rebelles, de vertiges, de migraines, mais ne vous disent pas un mot 'de la manière dont ils pissent,' soit qu'ils n'aient rien remarqué d'anormal de ce côté, soit, ce qui est plus fréquent encor, qu'ils n'attachent aucune importance à des modifications légères de la miction, modifications qu'ils ne jugent pas avoir de rapport avec les symptômes dyspeptiques dont ils souffrent.

"L'expérience du clinicien doit suppléer a l'ignorance aux idées préconçues ou à la légèreté du malade ; il doit, en présence de troubles digestifs mal caractérisés et que rien ne justifie s'informer de la micton, et ceci surtout chez les viellards. N'oubliez jamais, en effet, que rien n'est plus fréquent à cet age, que la rétention partielle d'urine par le fait l'hypertrophie prostatique ; rappelez vous aussi combien ces symptômes sont vagues et, pour ainsi dire, latents. Le sujet urine un peu plus souvent que de coûtume ; il se lève plusicurs fois par nuit, mais il ne souffre pas et prend assez volontiers son parti de cette incommodité. Aussi, nous vous le répétons, il est fréquent que le malade néglige de vous parler de ce "petit inconvénient" et concentre votre attention sur des troubles digestifs et sur eux seuls."—Guyon, "Leçons Clin.," 1896, vol. ii. p. 221.

THE recognition of the condition of a bladder incompletely emptied by the urinary act is all-important and by no means easy, whereas the principles of treatment are of the simplest.

And yet the clinical features of a typical case of "stagnation of urine," as it was called by Civiale and later English writers, once they have been recognised in their individuality, present an *ensemble* of symptoms that has only one significance. As more than 75 per cent. of all cases of retention are due to prostatic enlargement, the close study of their variety and degree is at least advisable. Complete retention in patients with enlargement of the prostate is, of course, a late phase in their condition. Even incomplete retention is very gradually established and only recognised after years of development, for the prostate enlarges slowly, and for years the bladder succeeds in completely emptying itself. Sooner or later, however, come the further stages of inability to empty the bladder even in part; that is to say, a temporary distension, or, later still, chronic partial retention of urine with distension of the bladder.

The early stages are shown by a frequency and a difficulty of micturition, experienced by day and by night. That the kidneys share in the congestion of the prostate is proved by the inrcease in the secretion of urine, especially during the night. The frequency and the difficulty, however, often pass unnoticed or unheeded, specially in old men who are prepared to suffer such inconvenience, and who, as long as they are free from actual acute retention, shrink from consulting a surgeon, and from the unknown dread of the catheter. The early symptoms, therefore, of retention, or of residual urine in the bladder, are all-important. They are *nocturnal polyuria* and *persistent digestive troubles.* The first symptom alone, namely, an obstinate frequency and difficulty of micturition during the night, points almost certainly to a badly emptied bladder. In such cases, as in all prostatics, everything that favours local congestion, such as prolonged lying in bed, too sedentary a life, too rich a diet, surface chill, disregard of nature's call to urinate, sexual indulgence, tends to bring on an attack of retention. As an accompaniment, the symptom of digestive disorders is almost pathognomonic, and the diagnosis is clinched by bimanual examination of the bladder, even without appeal to the catheter, which, however, must be made in treatment. The bladder should be evacuated slowly, and if there be any pain during the process, it will be well not to draw the urine completely off, but to inject small quantities of warm boracic solution until it comes out as clear as when injected. The urine may thus be entirely withdrawn without the bladder being emptied. If necessary—that is to say, if it be difficult or inconvenient to pass a catheter with sufficient frequency, every two, four, six, eight, or twelve hours—a catheter must be tied in, for artificial evacuation may be required for days. The golden rule is, to empty the bladder often, for long and aseptically. If the early period of prostatic enlargement be tided over successfully, one may hope to be spared the greater anxiety of later complications.

In "partial retention," of course, the essential feature is the patient's ability to pass urine, plus his inability to empty the bladder, due, in nine cases out of ten, to the mechanical obstacle presented by the enlarged prostate. In such cases, cystitis may bulk largely in the clinical picture, and it is, of course, due to infection. A foul catheter suffices, or, if there has already been infection in the past, fatigue, chill, and indiscretion in diet, may be enough to throw into activity germs which for years had remained innocuously enough in the urethra or in the bladder. In the more acute of such cases, general sedative treatment by baths, heat in the form of poultices, laudanum enemata, etc., are indicated.

As the stagnation becomes more chronic, the complications and alteration in the general health, rather than the local condition, make themselves felt. The bladder may consequently escape examination for months, although in all obstinate gastric derangement it is well to suspect and search for some "intoxicating" agent. A patient who has no difficulty in micturition, whose urine is clear, and who suffers merely from some loss of appetite and some frequency of micturition, can hardly be expected to direct his medical attendant's attention to his bladder, which, after all, may only contain some few ounces of residual urine. In time, however, such a patient will emaciate and lose colour with a rapidity that is only less striking than his rapid recovery under judicious and frequent catheterisation and general hygienic measures.

When the stagnation of urine becomes so prolonged and extreme as to be accompanied by positive distension of the bladder, it forms the most serious, the most intractable, and yet the most overlooked of all forms of partial retention of urine. The central fact of the condition is the distended state of the bladder, which makes itself felt throughout the whole urinary tract, from the ureters to the parenchyma of the kidneys themselves; the disorders thus set up, at first functional, soon become organic, and as there is yet no infection and, therefore, no cystitis, there is nothing beyond some frequency of micturition to direct attention to the urinary apparatus. The patient's tongue is red and dry, and coated to such a degree that swallowing and even mastication become intolerably distasteful. Vomiting and diarrhœa may set in, or the dyspepsia may express itself simply in loss of appetite and headache, and a sense of gastric weight. On the other hand, constipation of a most obstinate form may be the predominant feature of the digestive disturbances. Whatever form it assume, the pain, the loss of flesh and of appetite, the cachectic appearance and the age of the patient, combine to make the diagnosis of cancer of the stomach not unlikely, and one indeed that is frequently in the mind of the physician. It will be found, however, perhaps only upon direct inquiry, that these patients pass large quantities of urine, generally about 100 oz. in the twenty-four hours, and that they make water frequently, especially at night. The urine, as a rule, is pale, and clear without deposit. It cannot be too dogmatically stated that when the three symptoms—polyuria, frequency of micturition, grave digestive troubles are present—the *fons et origo mali* is almost certain to be a bladder that the patient cannot completely empty. Of all conditions that predispose to infection, none are more emphatic than this stasis or stagnation of urine in bladder, ureters, and kidneys, along with the lowered general nutrition. A catheter that is not aseptic is all but certain to be an infecting agent, and therefore an instrument the use of which, in these cases, is to be undertaken with a hyperscrupulous care.

Along with local treatment of the bladder, the régime advised should be a generous one—much milk, meat-juice, beef-tea, custards, eggs, soups, wine, bitter vegetable tonics and saline laxatives. Healthy out-of-door exercise in moderation is also to be recommended.

The evacuation of the bladder should be begun slowly and very cautiously, and may be increased, if all is favourable, to three or four times in the twenty-four hours. If infection be present, the bladder should be washed gently out with boracic solution, or silver nitrate 1 to 1000, using the syringe and a medium-sized catheter-coudé. The catheterisation should be of such frequency that the patient is conscious of no strong desire to micturate, and, upon each occasion, a small quantity of solution should be left in. These distended bladders, if completely emptied, not only cause pain, but, as a rule, bleed and may bleed freely.

In some cases it will be necessary to tie the catheter in, the plug of which may be removed every two or every three hours. In conclusion, it may be confidently asserted that were such principles of treatment conscientiously and intelligently followed, there would be less heard of excision of the prostate and castration, operations which would then be reserved for intractable cases of prostatic hypertrophy with retention.

ON MOUTH-BREATHING.

By J. L. Bunch, M.D., D.Sc., *Assistant Physician to the North London Hospital for Diseases of the Chest.*

Mouth-breathing is in the main merely a symptom of disturbed nasal respiration; but the evils which follow in its train are none the less serious and far-reaching. There can be little doubt that in normal respiration it is of importance to the organism that air should be inspired through the nasal passages, both in order that it may be warmed, and also that it may take up a certain amount of moisture. Some authorities[1] have taught that the air should be again expired through the mouth, especially during active exercise, in preference to expiration through the nose; but the reasons advanced in favour of this view do not seem to carry very great weight. Researches have been carried out in order to investigate the degree of warmth imparted to the inspired air during its passage through the nose by Aschenbrandt,[2] Kayser,[3] and Bloch;[4] and these investigators agree that the temperature of the air is thus raised by as much as from 10° to 25°. The former observer found that the final temperature of the air entering the trachea is independent of the temperature of the air outside the body, that is, of the inspired air; but Bloch showed conclusively that this is not the case. The amount of moisture imparted to the air during its passage through the nose will of course depend on the temperature and degree of saturation of the inspired air, and to some extent also on the rapidity of respiration. Interference with nasal respiration leads necessarily to inspiration through the mouth, and the nasal mucous membrane becomes to some extent functionless from disuse. The sense of smell becomes imperfect, and the lachrymal duct may become closed and tears trickle down the cheeks, adding appreciably to the patient's discomfort. The nasal mucous membrane is usually congested, the soft palate swollen, and the patient complains of perpetual headaches and frequently of tinnitus. When the obstruction is a post-nasal one, granular pharyngitis or pharyngitis sicca gives rise to dryness of the throat, hacking cough, and hawking up of offensive mucus. Nasal obstruction occurs most frequently in adults, and does not give rise to the widely open mouth and noisy respiration that characterise adenoid vegetations, but the lips are usually somewhat parted, and the patient has a peculiar stupid look.

In younger subjects and in infants this appearance of stupidity is far more marked, and gives them an idiotic expression which is quite characteristic. In post-nasal obstruction, especially when due to adenoids, the physiognomy is pathognomonic. The upper lip is thickened, the jaw drops, and the mouth is continuously open, and, in infants, there is frequently dribbling of saliva. The alæ nasi are motionless, and the nostrils broad and flattened. Breathing is noisy, and at night the child snores so loudly that it is often necessary to place it in a room by itself; while its sleep is disturbed, and frequently interrupted by cries and screams, so that it wakes up almost as tired as when it went to bed. The post-nasal obstruction prevents babies taking the breast, for when the mouth is closed respiration is no longer possible. Unless the infant is suitably fed by the bottle or spoon, it becomes weak, marasmic, and rickety; and these conditions reacting on the post-nasal growths produce a further aggravation of the symptoms.

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[1] Guye, "De la respiration par la bouche au point de vue de l'hygiene," Amsterdam, 1884.

[2] "Die Bedeutung der Nase für die Athmung," Würzburg, 1886.

[3] "Die Bedeutung der Nase und der ersten Athmungswege für die Respiration," Sep. Abd. aus Pflüger's *Arch. f. d. ges. Physiol.*, Bonn, 1887.

[4] "Untersuch. zur Physiol. der Nasenathmung," *Ztschr. f. Ohrenh.*, Wiesbaden, 1888.

The causation of the sudden attacks of asphyxia which occur in patients with nasal obstruction, is of considerable interest. These attacks come on in a subject otherwise healthy, soon after he falls asleep, causing him to wake up suddenly with a feeling of anxiety or even terror, which has usually been preceded by some terrifying dream. In most cases the attack is caused by the falling back of the tongue as soon as consciousness is lost, so that air can now enter the trachea neither through the nose nor through the mouth; but as soon as the sleeper wakes up, the soft palate is immediately raised and respiration is again possible. Henoch[1] first described a somewhat similar picture in children who have been previously healthy, but are in the initial stages of coryza. Sudden attacks of dyspnœa occur, which are relieved by sitting the child up. Henoch ascribed the attacks to sudden inflammatory swelling of the nasal mucous membrane, causing deficient nasal respiration. Kussmaul was not satisfied with this explanation, and inquired why it was that the child was relieved by sitting up, and why air did not enter by the mouth even if the nose were occluded. The explanation is, however, that the child was previously healthy and had never felt the need of mouth-breathing, and consequently did not know how to make use of it. The relief obtained by sitting the child up is due to the lessened amount of blood which reaches the nasal mucous membrane in this position, and its consequent diminution in bulk.[2]

The assertion has frequently been made, that idiots and imbeciles are usually mouth-breathers, and it has been suggested that an arched palate was a possible cause of the condition. That this is not the case has been shown by MacDonald,[3] who examined 213 inmates of the Earlswood Asylum, and found that only 33 were mouth-breathers—that is to say, a percentage very little higher than that found to exist in a large number of school-children.

Stammering is more frequently associated with mouth-breathing, but it has not been at all conclusively shown that there is any definite connection between the two conditions. Stammering is frequently a habit which has been acquired, and so also in many cases is mouth-breathing, quite apart from any structural changes in the naso-pharynx. Enuresis nocturna and other functional disorders, more especially in children, have been described by Koerner,[1] Bloch, and others as associated with oral respiration, but attempts to associate the latter condition with an underlying nervous condition have been far from satisfactory.

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[1] "Ueber Koryza der Neugeborenen und Pseudokrup," *Berl. klin. Wchnschr.*, 1864, Bd. 1.

[2] Cf. Ziem, "Ueber partielle und totale Verlegung," *Monatschr. f. Ohrenk.*, Berlin, 1879, S. 24.

[3] MacDonald, "Diseases of the Nose," 1892, p. 367.

By far the commonest cause of mouth-breathing is posterior pharyngeal obstruction due to adenoids. Other new growths may occur in the same position, and give rise to obstruction, as also may hypertrophy, œdema, and new growths of the tonsils and soft palate. Retropharyngeal abscess,[2] deformities affecting the buccal cavity or posterior nares, whether congenital or traumatic, are less common causes.

Nasal obstruction may be due to blockage of the nasal orifice, caused by new growths, such as rhinoscleroma,[3] or lupus, by hypertrophy of the skin from eczema[4] or other causes, or from paralysis of the facial nerve, which leads to drawing in of the ala nasi at each inspiration.[5]

Other causes of nasal obstruction are lesions of the septum nasi, due to congenital malformations, neoplasms, abscesses, or hæmorrhage beneath the mucous membrane after acute specifics. Hypertrophy of the inferior turbinates may be due to new growths or to acute or chronic inflammation, which, according to Fränkel,[6] causes hyperplasia of the cavernous tissue. Similar affections may involve the middle turbinates, or diffuse swelling of the entire mucous membrane may take place. Atresia of the choanæ, due to cartilaginous, bony, or syphilitic fibrous growths, and foreign bodies within the nasal cavities occur but rarely.

The neoplasms which most commonly involve the nasal mucous membrane are fibromata, myxomata, and papillomata; more rarely sarcomata and carcinomata.

The disorders to which mouth-breathing gives rise are chiefly those of the respiratory organs. The entry of unwarmed and impure air into the trachea frequently causes chronic bronchitis, which may in young subjects end in phthisis. Investigation shows that many phthisical patients, especially among the classes whose work takes them out in all weathers, have in their earlier days been mouth-breathers, and it is probable that this condition is also a cause of the development of tubercular glands in young patients. We know that the posterior wall of the pharynx has a double set of lymphatics, a deep layer and a superficial layer. Tubercle bacilli are inhaled by the mouth, and, lodging in the folds of the mucous membrane, are taken up by the lymphatics, especially if there be an abrasion of the mucous membrane. The bacilli are carried to the lymph glands, where they are incubated under the most favourable conditions, and a tubercular focus results.

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[1] "Enuresis Nocturna bei Mundathmern.," *Centralbl. f. klin. Med.*, Bonn, 1891.

[2] Clutton, *Phil. Trans.*, *London*, vol. lxxx. p. 383.

[3] Payne and Semon, "A Case of Rhinoscleroma," *Trans. Path. Soc. London*, 1885; Wolkowitsch, "Das Rhinsclerom.," *Arch. f. klin. Chir.*, Berlin, 1889, Bd. xxxviii. S. 356.

[4] Baumgarten, "Ekzema introitus narium," *Monatschr. f. Ohrenh.*, Berlin, 1885, S. 145.

[5] Ziem, "Ueber partielle und totale Verlegung der Nase," *Monatschr. f. Ohrenh.*, Berlin, 1879; Fränkel, v. Ziemssen's "Handbuch d. spec. Pathol. und Ther.," Bd. iv. S. 96; Clinton Wagner, "Mouth-Breathing," New York, 1881.

[6] *Loc. cit.*

When there is nasal obstruction associated with large tonsils,[1] the entry of air may be very deficient, even in mouth-breathers: and in rickety children, and those with abnormally soft costal cartilages, the lower ribs may be sucked in during inspiration. There results a depression of the inferior costal portion of the chest, which may lead on to well-marked pigeon-breast. In rather older patients, who indulge in very active exercise, such as cycle-racing, which causes considerable strain on the respiratory capacity, especially in the cramped position of the professional rider, a less marked variety of the same condition may develop. In conclusion, it is only necessary to call attention to the fact that those who habitually keep the mouth open do not necessarily breathe through the mouth, and in such persons the diagnosis is by no means easy. But if during respiration the tongue is found to be arched up firmly against the soft palate, it may be justly assumed that breathing is being carried on normally through the nasal passages.[2]

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[1] Cheval, "Hypertrophie de la tonsille retro-pharyngienne," Brussels, 1894; Chatellier, "Tumeurs adenoides du pharynx," Paris, 1886.

[2] Honsell, "Beobachtungen ueber die Lage der Zunge, u.s.w.," *Ztschr. f. rat. Med.*, Bd. xxiii. S. 230.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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A Manual of Surgery for Students and Practitioners. By WILLIAM ROSE, M.B., B.S. (Lond.), F.R.C.S.; and ALBERT CARLESS, M.S. (Lond.), F.R.C.S. London: Baillière, Tindall & Cox. 1898.

IN spite of the number of English and American text-books on surgery which have been published within the last decade, we are inclined to agree with the authors that there exists a "genuine need" for a manual of surgery which furnishes the student and practitioner with an account of the principles and, to a sufficient extent also, of the details of surgery, within a compass which they can readily overtake and master. Difficult as was the task the authors set themselves, they have achieved a large measure of success, and the eminently practical nature of the book will make it as welcome to the practitioner as it is helpful to the student.

The plan and arrangement of the subject-matter are on more or less recognised lines. The opening chapters are devoted to the nature and treatment of those general pathological processes with which the surgeon must become familiar. But it is to be regretted that a more natural arrangement was not adopted, in which wounds would fall to be considered along with non-organismal inflammation, while organismal inflammation would be studied along with suppuration and the wound infective diseases; an arrangement also which would have avoided the incongruity of placing the description of tumours and cysts between the chapters on sepsis and infection, and that of wounds and hæmorrhage. Moreover, the use of the term sepsis in its original restricted sense, although etymologically correct, is undesirable, and has led to an unnecessarily complicated classification in considering the inflammatory affections of bones and joints.

The chapter on tumours and cysts is, on the whole, comprehensive, lucid, and well illustrated. But we find no mention of melanotic epithelioma, and would be glad to see the meaningless terms "cylindroma" and "plexiform sarcoma" replaced by the genetic term "endothelioma." Also, in considering the parasitic causation or infective nature of cancer, objection must be made to the statement that the peculiar bodies found in Paget's disease of the nipple are psorosperms, as it is now conceded by pathologists that these bodies are merely modified epithelial cells.

As the success of operations depends so largely on the technique employed for wound treatment, we have pleasure in quoting the following passage:—"We cannot emphasise too strongly the urgent necessity of attention to the minutest details if success is to be attained, especially since so many of the operations now undertaken are only justifiable under such conditions." The method described is that which is followed at King's College Hospital. The aseptic method, which is now employed by many of the foremost surgeons of the day, receives scant recognition. This is no doubt due to the supposition of the authors that this method "requires infinitely more attention than does the antiseptic method"—a dictum at variance with the experience of those surgeons who have practised both methods. Before passing from this subject, attention must be drawn to the absence of instructions for the sterilising of catgut.

The chapters on affections of blood vessels, lymphatics, nerves, and muscles, are excellent. The same may be said of those dealing with fractures and dislocations. The Paci-Lorenz bloodless method of treating congenital dislocation of the hip in children might with advantage have been more fully described. Injuries of the head and spine are ably treated, but cranio-cerebral topography is somewhat cursorily disposed of.

Referring to arthrectomy in the treatment of tubercular joints, we quote with approval the following remarks as to its practical value:—"If the proceeding is limited to the synovial membrane, we have little confidence in it, recurrence being frequently met with; but if it be modified by the additional removal of a thin slice of articular cartilage, so that it is converted into a limited excision, and osseous ankylosis between the two epiphyses is obtained, good results may be anticipated."

A useful chapter is devoted to deformities. The authors recommend, and we think rightly, the open method of dividing the sterno-mastoid muscle in torticollis.

While the chapters on regional surgery are all excellent, those dealing with hernia, and abdominal surgery generally, are especially valuable and instructive. For the radical treatment of hernia, preference is given to the more simple operation of Mitchell Banks, the operation of Bassini being recommended for special cases. The operative procedure given as Kocher's has been abandoned by that author in favour of the modification which he describes in the last edition of his text-book. As regards acute appendicitis, the authors take up a position not far short of that of Osler, who states "there is no medical treatment of appendicitis." In grave cases they say—"Personally, we are distinctly in favour of early operation, and the general rule (to which, of course, there are exceptions) which we would suggest as justifiable is that, if, in spite of suitable rest and medical treatment, the symptoms, both general and local, are not commencing to abate at the end of forty-eight hours, operation should be undertaken." As regards relapsing appendicitis, the statement, namely, "that radical treatment must be instituted if the attacks are at all frequent," is not sufficiently definite.

In respect of hypertrophy of the prostate, the author's views on treatment may be summed up as follows:—If catheterism fails, operations should be undertaken; for localised outgrowths projecting into the bladder, suprapubic prostatectomy is recommended, vasectomy or double castration being reserved for cases of general enlargement of the organ, especially when soft and succulent. Where, for one or other reason, these operations are not applicable, a permanent suprapubic or perineal fistula must be established.

With the object of rendering the work more comprehensive, the authors have had limited recourse to small type, and in this way have been enabled to incorporate a short but satisfactory description of all the more important surgical operations, including chapters on ligature of arteries, amputations, and excisions. The volume concludes with a chapter on anæsthetics. The useful methods of inducing local anæsthesia associated with the names of Oberst and Schleich, are not referred to in the paragraph dealing with cocaine. The account of general anæsthetics is valuable and impartial.

The work is liberally illustrated, but the figures are of unequal merit. We are surprised that the subject of healing of wounds is illustrated by drawings no more recent than the diagrams which did such good service in the classical, but now historical, work of Billroth. Fig. 335, illustrating lumbar incisions, is quite unworthy of the book, as it is not only crude, but gives an erroneous impression of the position of the kidneys. A free use of heavy type in emphasising the subject matter of each paragraph has rendered the book easy of reference, although the general "get-up" of the volume is not attractive.

The work is well proportioned, reflects throughout the ripe experience of the authors, and is written in language at once concise and lucid. It can be confidently recommended to students and practitioners as one of the most reliable and practical text-books in the English language.

HAROLD J. STILES.

Text-Book of Mental Diseases, with special reference to the Pathological Aspects of Insanity. By W. BEVAN LEWIS. London: Charles Griffin & Co. Ltd. 1899.

IT is scarcely ten years since Dr. Bevan Lewis published his first edition, and his book at that time marked a distinct epoch in English psychiatric literature. For the first time there was laid before the profession a text-book on mental diseases founded upon pathological research, and, what was more wonderful still, upon the original research of the author himself.

Since that date a host of workers in every country in Europe have incessantly produced new and valuable researches in the domain of mental pathology, so that latterly we had begun to lose sight, even within that short space of time, of the greatest of our own pathologists. In the work before us, however, Dr. Bevan Lewis has assimilated the work of such men as Golgi, Weigert, and Cajal, and has at the same time maintained his own individuality as an original thinker and worker, and has successfully established what was always his contention, and practically his own discovery, namely, the superiority of the fresh-frozen method in the examination of the cerebral cortex. There can be no question that, however valuable the various staining methods introduced by Golgi and his disciples have been, for the general examination of the cortex, no other method can supplant the one which bears the author's name.

The part of the work dealing with the histology of the cortex is beautifully and profusely illustrated.

With regard to the clinical part of the book, we are confronted with an enormous mass of new facts, new ideas, and new aspects of the symptomatology of nervous disease. Most of these new ideas must be attributed to the labour and research of the author. The portions dealing with the morbid psychology of acute insanity are particularly excellent, and so are the clinical nervous symptoms of general paralysis and alcoholism. The two latter have been treated in a masterly way, and in a manner which at once places psychiatry on an equal platform with any other branch of medical science. At the same time it must be confessed that the clinical part of the book does not successfully fulfil the object of the author, because the subject is presented in a way that places it entirely out of line with the historic developments of thought in this department. Dr. Lewis has evidently devoted himself more intensely to certain aspects of disease than to others, which renders the whole book rather encyclopædic in its character, so that certain subjects, especially systematised progressive insanity (paranoia), are somewhat perfunctorily described, while others, such as the insanity of adolescence, and what he terms "recurrent insanity," receive too much attention. It is also noticed with surprise that monomania still continues to be described separately.

A chapter on the treatment of insanity, including therapeutics, deserves special attention and commendation.

It is, however, on the section dealing with the pathology of insanity that the chief value of the book depends. Dr. Bevan Lewis was the first man in this country to write anything approaching a systematised description of the pathological processes underlying some of the principal forms of mental affection. In his first edition he describes the pathological anatomy of general paralysis, epilepsy, alcoholism, and senile insanity. That he has not, in the present edition, enlarged the category of diseases whose pathology is distinctive, is not because nothing more is known, but because, as we had anticipated, certain general morbid processes are common to the less pronounced and less differentiated forms of mental disease. The author still sticks to his opinion, formerly expressed, that the hypertrophied neuroglia cell is a "scavenger" cell, and forms a part of the lymph connective system of the brain. This is a subject which he must be left to fight out with his critics. He also maintains his view that the true morbid histology of epilepsy is to be found in the vacuolation of the nuclei of the small cells forming the second layer of the cortex. The remarkable tenacity with which this view has been upheld and combated for the last ten years, makes it impossible for any person who is not a specialist in nervous pathology to enter into the contest. That there is a relation between epilepsy and this lesion it would be absurd to deny, in face of the demonstrations of Dr. Lewis and his disciples; it would, however, be equally foolish to assert that it is universally met with in epilepsy.

Notwithstanding the somewhat encyclopædic character of this book, to which reference has already been made it forms one of the most monumental works on mental diseases in the English language, and one of which not only Dr. Lewis himself, but also his fellow-specialists in this country, may reasonably be proud.

JOHN MACPHERSON.

Annual Report of the Medical Officer of Health of the City of Edinburgh, for the year 1898. Edinburgh, 1899.

SIR HENRY LITTLEJOHN'S Report for 1898 has just been issued. The Report contains vast masses of facts and figures of the greatest hygienic value. Only those that are in the service know how much detailed labour of analysis and selective synthesis goes to the marshalling of such varied materials. The casual reader picks up his death-rates and birth-rates with a glance; he little understands how troublesome it is to give him the exact figure he grasps so easily. Sir Henry Littlejohn's Report is calculated to impress him. Let me touch on a few of the hygienic quantities that express the life of a huge social organism like Edinburgh. The estimated population for 1898 was 295,628. This must be taken conditionally; the errors due to the latter end of the intercensal period and to the recent changes of boundary cannot be well eliminated. But, with that population, the death-rate was 17·99 per 1000, and the birth-rate 27·38. The death-rate in 1861 was 23·15; in the years since then, it fell four times to 17; once to 16; once to 15. Once it rose to 27 (in 1871). The curve of the birth-rate is a tolerably straight line downwards, from 33 in 1861 to 26 in 1894. From 1890 to 1898 the birth-rate has not risen above 28 per 1000. The "economics of the birth-rate" is matter for a volume, not for a note. Of the causes of death, the zymotics, as usual, rank high; but it is instructive to note how the spaces after smallpox, relapsing fever, cerebro-spinal fever, hydrophobia, glanders, anthrax, and a few other fierce diseases stand blank. The practical problems of the present are grouped round measles, whooping-cough, diphtheria, enteric fever, scarlet fever, diarrhœa, and one or two others. Tuberculosis is *facile princeps*. In the ten years from 1888 to 1897 the deaths from zymotics were 4792 (or 1·7 per 1000); the deaths from phthisis alone were 4956 (or 1·8 per 1000). The tide, as the report elsewhere shows, is steadily rising in favour of a more drastic treatment of the tuberculosis problems, and it is time. The figures of notifications and deaths are admirably set forth in graphic charts, which are at once definite enough to impress and not too complex to be readily interpreted. Simple inspection of the yearly charts discovers that enteric fever, in the last ten years, ran from 220 to 500; that the last three years show a decline; that diphtheria, which reached 320 or thereby in 1894, was over 250 in 1898; that scarlet fever, which reached some 2800 in 1895, and 2200 in 1896, still gave 2400 in 1898; that measles varied from 1000 in 1894 to 8000 in 1897, there being nearly 4000 in 1898; that typhus ran from zero in 1895—the first clear year since (at least) 1880—to 75 or thereby in 1898; that smallpox gives a gap-toothed chart, with blanks at 1890, 1891, 1892, 1896, 1897, and a small stump at 1898. The most disappointing chart is the chart for scarlet fever. This manageable infection, whose most prominent habits are well understood, ought not to yield so steady a harvest. The seventy cases of typhus are also an unwelcome reminder of the continuity of filthy habits from generation to generation. The details of the typhus outbreaks are given with care; the case death-rate was 11·2 per cent., or, with addition of doubtfuls, 16·4 per cent. Of disinfection, a word:—5711 apartments were "disinfected"; 8600 articles of bedding and 4140 articles of clothing were disinfected by steam. In my experience, each scarlet fever case yields about ten articles for steam disinfection (exclusive of articles steeped at home, under direction of the medical officer of health); 2400 cases of scarlet fever, therefore, would, in Leith, give roughly 24,000 articles. Typhus cases yield anywhere between 100 and 1900 articles per house. Accordingly, the proportion of disinfections to cases seems to me small. Doubtless, home disinfection plays a large part in Edinburgh; but in my experience that is frequently worthless, unless it is directed by a strict-minded medical attendant. The "fumigations" were presumably sulphur fumigations, which, to be effective at all, must be done with "Teutonic" thoroughness. A multitude of interesting details are to be found in this Report, which every student of health progress will study with much profit. It is a generation since Sir Henry Littlejohn produced his elaborate book on the Sanitary Condition of Edinburgh, and this yearly tale of facts and work done deserves, as it will everywhere receive, the cordial welcome and recommendation due to the director of a great organisation. The Report is yet another example of his known power to "make these dry bones live."

W. Leslie MacKenzie.

Outlines of Zoology. By J. Arthur Thomson, M.A., Regius Professor of Natural History in the University of Aberdeen. Third Edition. Edinburgh and London: Young J. Pentland. 1899.

Thomson's "Zoology," one of the most popular of handbooks with junior students, has now reached its third edition. The volume is, if anything, rather less bulky than it used to be, a result not attained by the sacrifice of scientific matter. In its present form it is a handsome and handy volume—its usefulness need not be specially dilated upon, for every elementary student is well aware that at the present time no outlines of zoology are so clear, so comprehensible and comprehensive, as those of this book. Some new illustrations have been added, without greatly increasing the attractiveness of the work. Such pictures as those of the seal and porpoise seem to us to carry no useful lesson, but remind one rather of the natural history diagrams issued by the Society for Promoting Christian Knowledge for use in elementary schools. We should have preferred some of Cole's splendid pictures of the cranial nerves, or Rückert's lucid figures of the reduction of the chromosomes. But it would not be fair to grumble too much, when we find Hill's diagram of the placentation of *Perameles* and Osawa's drawing of the brain of *Hatteria*.

The choice of illustrations is, of course, largely a matter of opinion, but this is hardly the case with that of matter. As the book is mainly intended for medical students, the results of certain recent researches should, we think, have been given in more detail.

Thus it may be questioned whether any student or any reader will obtain a clear and definite idea of what is meant by "reduction of the chromosomes" in oögenesis and spermatogenesis (p. 59). The case cited (*Ascaris*) happens, although the author looks upon it as one of the clearest, to be one of those in which it has least satisfactorily been elucidated. Here Rückert's brilliant work on *Cyclops*, and in the light of that Moore's and Haecker's researches, might have been epitomised with advantage to the student and to his teacher. That curious and significant linking of chromosomes in pairs, prior to the reduction and termed by Moore "the synapsis," is not even mentioned. But although Moore did not fully grasp its significance, there is no doubt that the process termed by him "synapsis," like the associated formation of "ring-chromosomes" (also ignored), is one of supreme importance. The account of parthenogenesis on the same page also leaves much to be desired, for, while stating that sometimes two polar bodies are formed in this, the author omits to mention that, if the second one be formed, it never leaves the egg, but copulates like a spermatozoon with the pronucleus of the latter.

The accounts of the mammary glands and hair of mammals, in view of all the recent work on those subjects, are sadly deficient. And one would have wished for some detailed notice of Hubrecht's views on the development and nature of the amnion and of the segmentation and formation of the germinal layers in the insectivore *Tupaja*. Some of these may present difficulties, but to ignore them lightens only the author's task, while leaving the student with a heavier burden to bear alone. Such a course may increase the charm of a seductive book, but undoubtedly it somewhat impairs its usefulness.

At the same time, author and publisher are to be congratulated on this new edition, which both may rightly deem a decided improvement and advance on the two preceding ones. The teacher of zoology, the general reader, and the average student, for whom it is more particularly intended, are likely to agree with this view.

J. BEARD.

Psychiatrie: Ein Lehrbuch für Studirende und Aerzte. By Dr. EMIL KRAEPELIN. Sixth Edition. Leipzig: J. A. Barth. 1899.

THE last edition of this important work consists of two volumes; the first volume extends to 360 pages, and deals with psychiatry in general. The subjects treated of are causes of insanity, its symptoms, its course and duration, its diagnosis, and the general therapeutics of the subject.

Among the subjects dealt with in the first volume, the alterations made on the previous edition are few and unimportant. The more or less purely psychological chapters contain additional matter, chiefly in connection with disturbances of memory, with an investigation into the faculty of attention, and an ingeniously constructed theory intended to show the means by which memory is augmented and intensified by the faculty of attention. New matter regarding the arrest of the normal rapidity of thought, owing to resistances and disturbances either outside or inside the organism, deserves attention. Disturbances of the judging power, of the will power, and of conduct, with an interesting exposition of the origin of impulses, receive more attention in the new edition. With the exception of the instances given, the first volume differs in no particular from the first part of the old edition.

Volume ii. extends to 600 pages, and deals exclusively with clinical forms of mental disease. It will not be without some surprise that the reader will observe the radical change which the author has considered it necessary to make in his classification of the insanities. It must be admitted that so sudden a shifting from his former position in this respect does not tend to increase the confidence in the teaching of a man who is recognised as one of the leading psychiatrists in Europe. The various classifications of the insanities have come to be a byword and a reproach to the specialty; and there is every allowance to be made for independent judgment and concession to the rapid formation of new discoveries, both clinically and pathologically. At the same time, it is not a little unsettling when an eminent psychiatrist startles his audience with a very striking and original classification, and within three years virtually departs from some of its main features without either explanation or apology. Whereas the classification in the former edition was drawn up in such a way as to indicate the origins and affinities of the various forms of insanity, in the edition now before us the author has set them forth in such a way as to convey the impression that each of the groups constitute individual entities. Whether or not this has been the author's intention, and however much astray he has been in his former attempt, we cannot help believing that the system he has now adopted is distinctly retrograde. Space will not permit of a thorough examination into the differences between the two classifications. The following are the main points :—Deliriums of fever and of acute infection have been separated from the "exhaustion" processes (*Erschöpfungsirresein*), and placed in a separate group (*Das Infectiöse Irresein*). The great group of auto-intoxication (*Stoffwechselerkrankungen*) has been dispensed with, and three separate groups, thyrogenic insanity, dementia præcox, and general paralysis, formed out of it. Dementia præcox, which has now a division to itself, is more extensively treated of. The constitutional insanities, which formerly included mania, melancholia, and paranoia, have been broken into two. The two former are classed together as *Das Manisch-Depressive Irresein*, and paranoia is treated of under a separate division. There is still a wide difference between the author's views on paranoia and those of the French school; and one cannot help feeling that in this particular at any rate the Germans have still much to learn. JOHN MACPHERSON.

Zur Austilgung der Syphilis. Abolitionistische Betrachtungen ueber Prostitution, Geschlechtskrankheiten, und Volksgesundheit, nebst Vorschlägen zu einem Syphilisgesetz. Von Dr. Med. ERNST KROMAYER, Privatdocenten der Dermatologie u. Syphilis a. d. Universität, Halle. Berlin: Gebrüder Borntraeger. 1898.

WE had read Kromayer's "Allgemeine Dermatologie" with much interest and profit, and felt sure, therefore, that he had something of value to say on the question of the extinction of syphilis, and a perusal of this closely printed if small volume has not disappointed us. The work appears at a time when public attention in this country has been awakened to the increasing prevalence of this insidious disease. Since the ladies have taken up the matter, we may hope that things will not rest as they are. If proof were wanting of the far-reaching nature of the evil, the names of those intelligent and prudent women, who, horrified at the harm due to it they have themselves witnessed, have signed a petition for a parliamentary inquiry, would be amply sufficient. Kromayer enters briefly into the cause of prostitution, the main source of the diffusion of venereal diseases, and finds it essentially in the powerlessness of the woman to resist the overpowering passion of the man. No doubt there are other if minor ones, such as the desire for a luxurious life at all hazards, the love of dress, and in some a vicious proclivity. He does not see any chance of abolishing prostitution by any process of education or moral levelling up. Its ranks will constantly be recruited from females chiefly belonging to the lower orders. He then scans the effect of the existing systems of control on the dissemination of venereal diseases in general. Here he educes a curious fact. No system of supervision and examination has any effect in reducing the percentage of gonorrhœa, though all such materially lessen that of syphilis. The data and the reasoning on which these conclusions are based seem quite incontrovertible. Gonorrhœa, if obstinate in men, is frequently lethal in women. He would therefore make it a criminal offence for a man to marry with an uncured gonorrhœa. He lays down very clearly on what evidence alone it may be considered cured. Positive proof must be forthcoming, the mere absence of Neisser's gonococcus is but negative and insufficient. He would therefore erase gonorrhœa from the diseases under control, and urges that all our energies should be directed to the war against syphilis, where victory, if difficult, is not unattainable. He would make, in a modified sense, the witting communication of syphilis a penal offence, and insists that every case should be treated, till past the actively communicable stage, by recognised practitioners. He formulates a series of well-conceived regulations whereby this end might be attained. These undoubtedly savour of Germanic autocracy, and we fear from their stringency could hardly be enforced here, yet are on correct lines, and if carried out would lessen the scourge. It does seem anomalous that, while we hedge round the sufferer—generally such by no fault of his own—from scarlet fever and typhus, forbidding him under pain of punishment from disseminating his disease, we allow the infinitely more serious syphilis to be implanted, more or less voluntarily, without restriction of any kind. The work is one which forcibly arrests attention, and incidentally deals with many matters of the highest importance in what may be termed the natural history of venereal affections and their influence on the general health of the community.

W. ALLAN JAMIESON.

On Fractures and Dislocations. By Professor Dr. H. HELFERICH. Translated from the Third Edition (1897), with Notes and Additional Illustrations, by J. HUTCHINSON, jun. London: The New Sydenham Society. 1899.

THIS treatise on Fractures and Dislocations forms one of the volumes for 1898 of the New Sydenham Society, and the translation we owe to Mr. J. Hutchinson, jun. The chief feature of the book is undoubtedly the illustrations. There are sixty-eight lithographic plates, containing, I find, 228 figures, and 126 figures in the text. Of the plates it is difficult to speak too highly; whether regarded from the artistic point of view, or from the anatomical standpoint, they leave nothing to be desired. In a preliminary note, Mr. Hutchinson indicates his share of the work. He has divided the volume into chapters and added an index, an indispensable adjunct to a work of this kind; and he states further, that all the notes are by the translator. These are numerous, and add very materially to the value of the book. One on page 82, illustrated by means of a skiagraph, is interesting as showing the nature of the mass of bone so often felt just above the elbow-joint in cases of separated epiphysis or fracture in this situation. Many notes are added on the separation of the various epiphyses, a subject to which the translator has made many valuable contributions, and on which he is entitled to speak with authority. A very necessary addition is made to the treatment of fractured patella by operative means, though this might with advantage have been rather fuller than it is. Some of the splints in everyday use in England are not mentioned, and a few more additions to supply deficiencies in this respect would have been useful. Owing to the clearness of description and the beauty of the illustrations, this is a book that should meet with a cordial reception from practitioners and students, and to the latter especially it should prove a great aid in the study of a subject usually voted difficult and dry.

G. BELLINGHAM SMITH.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,

MEDICAL REGISTRAR, EDINBURGH ROYAL INFIRMARY.

SYPHILIS.

Congenital immunity to syphilis.—Ogilvie (*Brit. Journ. Dermat.*, London, 1899, vol. ii. Nos. 124, 125) falls foul of the dictum fathered on Profeta, but which, as he points out, should more properly be credited to Behrend, who was really the first to enunciate it, namely, that a healthy child, born of a mother with general syphilis, is not in danger of acquiring syphilis if suckled by her, or even, as Profeta added, from a syphilitic wet-nurse. Behrend published his observations in 1860, Profeta in 1865; Diday in 1884 christened this law with Profeta's name. More recently several authorities have gone a further step in advance; so some say that children born from mothers who have become directly infected with the syphilitic poison during their intra-uterine life, are usually healthy, and are immune throughout after-life to the disease; others, that healthy children of syphilitic parents (either parent or both) are thereafter immune, whatever stage of the disease may be present in their parents. Ogilvie seeks to show that no proof has yet been advanced of the actual existence of any such immunity as that alleged to be possessed by healthy children of syphilitic parents, which can bear criticism. Immunity may be conferred on the offspring under these conditions, but he is unable to find any positive evidence of its occurrence in the instances hitherto cited as proofs thereof. The so-called "law" is merely a "theory."

The main argument used by Ogilvie, in his opposition to the reality of the suggested occurrence of immunity to syphilis in children born of syphilitic mothers, lays the blame upon the mother, not the child. The mother has usually passed beyond the infective stage before the birth of the child, and the child's freedom from infection is not *in toto* but *in loco parentis.*

Hutchinson gives the duration of syphilitic contagiousness as lasting for six or nine months in the greater number of cases; at the outside, at least with few very rare exceptions, two years form the limit. Thus it can be easily realised that infection of the child through the mother is more likely to occur where the maternal disease is post- rather than where it is pre-conceptional.

Preconceptional syphilis in the mother of a full-time child must be of more than nine months' duration; on the whole, it may be said of more than twelve months' history. What time the child is born, the chances of post-partum infection from the mother are much lessened. Practically, every case in which general syphilitic symptoms appear in a child within two months of its birth, must be ascribed to intra-uterine infection.

Summing up on the whole subject, it appears that—

"(1) No facts exist to prove that paternal syphilis ever confers immunity, partial or complete, upon the offspring, no matter whether at the time of procreation the father is actually syphilitic, or has become immune to syphilis by previous disease. (2) No facts exist to prove that maternal syphilis in its tertiary stage confers immunity, partial or complete, upon the offspring, or that the mother's immunity to syphilis acquired by previous disease is ever hereditarily transmitted to her child. (3) It seems certain that mothers, syphilitic before delivery, rarely communicate the disease to their offspring in extra-uterine life. Such contamination has been observed in some cases of post-conceptional syphilis. Whether it ever occurs in pre-conceptional syphilis we do not know.

"In *pre-conceptional* syphilis two circumstances co-operate towards this result—(*a*) That it is exceptional for mothers with pre-conceptional syphilis, who give birth to healthy viable children, to present infectious lesions after delivery, from which the child's infection could be derived. (*b*) That infection by nursing, after the first year, from a woman's infection, is altogether exceptional.

"In *post-conceptional* syphilis, also, two points have to be taken into consideration—(*a*) That post-conceptional syphilis is relatively rare; (*b*) that acquired syphilis appearing in the child after the second month of life may, in not a few instances, have been mistaken for congenital syphilis, simply because the mother's syphilis dated back to a period previous to delivery.

"These circumstances, taken together with the effect of timely and appropriate treatment, may explain—to a certain extent, at least—the child's apparent immunity from infection by its mother."

Contagiousness of tertiary syphilis.—Neumann (*Wien. med. Presse*, 1899, Bd. xl. S. 1) considers three to four years as the normal duration of the contagiousness of syphilis, in cases treated carefully and properly from the first; that is to say, when the secondary stage may be regarded as terminated. In many instances, however, the disease has been found to be communicable from secondary lesions after the lapse of as many as ten to thirty years from the date of the primary infection, especially by erosions of the mucous membrane of the mouth. The customary products of the syphilitic poison during the third stage are seldom contagious, but if they are formed at an earlier stage than usual, the more so if co-existent with secondary lesions, are often communicable. The contagiousness of syphilis varies directly with the intensity of the disease, and inversely to its duration. The power of transmitting syphilis to the offspring diminishes with duration of the attack, but is quite independent of the presence or character of contagious lesions, and often first appears in advanced periods. The blood and the semen are sources of infection as well as the products of syphilitic processes.

Paralysis and syphilis.—Speyr expresses his conviction (*Cor.-Bl. f. schweiz. Aerzte*, Basel, 1899, Bd. xxix. S. 5) that the more patients he meets with suffering from paralysis in one form or another, the more he is convinced that they are of syphilitic habit. He even asserts that he does not believe in "paralysis without syphilis." The difficult matter of reconciling absence of symptoms, or of no history of antecedent attack, is discreetly surmounted by adoption of the idea that the signs of former syphilitic disease frequently vanish, and through the thorough disbelief in the credibility of any denial made by a sufferer from paralytic lesions as to his former freedom from specific infection.

INFECTIOUS DISEASES.

Clinical and bacteriological diagnosis.—(1) J. W. WASHBOURN (*Journ. Sanitary Institute*, vol. xx. part 1).—The presence of diphtheria cannot be accurately diagnosed from purely clinical observations. The ordinary method of removing some of the exudation from the parts affected by means of a sterile swab, cultivating from it the micro-organisms capable of growth upon blood serum or other chosen media, and examining the colonies which appear under the microscope after appropriate preparation, is not by any means free from fallacy. Many bacilli, especially the *B. xerosis* found often in the conjunctival sac, closely resemble the diphtheria bacillus, unless tested upon animals.

It is certain that absence of diphtheria bacilli from diseased parts, especially after two or three cultivations have been made from them, is negatively reliable. But a positive result is by no means so trustworthy. Occasionally true diphtheria organisms, as shown by their effects upon living animals, can be found in the throat, nose, and other parts, without the appearance of any symptoms. Hoffmann's bacillus is much akin to the true form, and is often present in healthy and inflamed throats, but has not (so Washbourn) any part in the causation of diphtheria.

From his experience, however, he lays down as a general rule, that the presence of bacilli, resembling the bacillus of diphtheria in their morphological characters and behaviour, in inflamed throats, where the clinical signs are as those of diphtheria, is sufficient to justify a positive diagnosis of this affection. On the other hand, the identification of these closely allied forms in the nose, conjunctiva, or subcutaneous tissue, is no proof of the actual presence of diphtheria; to prove its presence all the available tests must first have been employed. Todd has put on record the presence of bacilli in the nasal exudation of a series of cases with infectious rhinitis in a scarlet fever ward, which, on investigation, proved to be true diphtheria bacilli, without any faucial symptoms occurring in any of them, nor with any faucial invasion of other patients.

Again, persons with healthy throats from which true diphtheria bacilli have been grown, are they infective? Do they merit isolation? Washbourn thinks there is not much danger from them, but that they are infective, and if possible should be isolated, especially in hospitals and schools. Finally, while clinical signs or ordinary bacteriological evidence are not sufficient for a complete diagnosis, when separately considered, their conjunction is adequate for this purpose.

(2) J. W. Washbourn, with J. W. H. Eyre (*Lancet*, London, April 1899).—In treating cases of scarlet fever, it is often forgotten that the inflammatory condition of the fauces may be of multiple origin. Ranke found diphtheria bacilli in as many as 53·7 per cent. of the patients he examined in Munich. Out of eighty-seven scarlet fever cases in London, Goodall found the long variety in six, the short forms of these bacilli in thirteen, or 21·8 per cent. in all; Bigge, similarly, in 36·4 per cent. of 140 cases.

The differences between these figures probably depends upon the inclusion and exclusion of types like Hoffmann's bacillus. The writers, out of 666 cases of scarlet fever admitted into the London Fever Hospital, from March 1896 to the end of 1898, found—

(*a*) Cases on admission with bacilli resembling those of diphtheria .	8	1·2 per cent.
(*b*) Cases with Hoffmann's bacillus on admission . . .	21	3·2 ,,
(*c*) Other cases . . .	637	95·6 ,,

In considering the above results, three points of interest appear—(1) Bacilli resembling the diphtheria bacillus in morphology were found on admission in the throats of only 1·2 per cent. of the cases; (2) only a minority of these cases presented clinical evidence of diphtheria; (3) the presence of Hoffmann's bacillus in the fauces did not appear to play any part in the causation of diphtheria.

They believe that post-scarlatinal diphtheria is due to the introduction of unrecognised cases of diphtheria into the scarlet fever wards, and that this can only be obviated by systematic bacteriological examinations of all cases on admission, and by separation of those in whose throats diphtheria bacilli are found. If Hoffmann's bacillus, which they believe to have no direct causal connection with diphtheria, be excluded, the number of such cases, though probably greater among patients more liable to double infection than theirs, should not be beyond the isolation resources of most fever hospitals; moreover, absolute isolation does not appear to be essential. At any rate, the method deserves trial on a larger scale.

(3) J. W. Washbourn and G. C. Garratt (*Brit. Med. Journ.*, London, 15th April 1899).—Pane's antipneumococcic serum protected rabbits against the fatal effects of the injection of pneumococci obtained from two different sources, and in the author's hands proved to exert exactly the same degree of activity as that claimed for it by its deviser.

SURGERY.

UNDER THE CHARGE OF

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THE RECOGNITION OF URINARY CALCULI BY THE RÖNTGEN RAYS.

DR. HANS WAGNER has made the following observations in Mikulicz's clinique in Breslau:—(1) A girl, æt. 10 years, was admitted with a sinus in the region of the left kidney; a skiagraph showed four stones, one of which corresponded in size and form to the cavity of the pelvis. The subsequent operation confirmed these appearances. (2) A woman, æt. 38, was admitted with signs of a left perinephritic abscess, which was regarded as having originated from a calculus in the kidney. The skiagraph showed a stone about the size of a walnut. The abscess was opened; the patient died before the proposed nephrectomy was carried out; the stone was found on post-mortem examination. Subsequent chemical analysis showed that the stones in both cases consisted of phosphates of lime and magnesia, along with a small quantity of ammonium phosphate. These observations prove the possibility of obtaining good Röntgen pictures of phosphatic calculi, notwithstanding the statement to the contrary by Ringel. Dr. Wagner made experiments with specimens of calculi of various composition, and found that those composed of urates gave the poorest shadows. In one experiment he placed four calculi of different kinds on the abdomen of a patient, and photographed them through the entire thickness of his body; all the stones appeared on the plate; the uric shadow was the faintest, the oxalate of lime the best, while the phosphatic shadow was intermediate between these. All the stones appeared larger on the plate, because the respiratory movements of the patient's abdominal wall prevented them lying still. Vesical calculi behave in the same way as those in the kidney. Dr. Wagner has photographed them successfully in eight cases. Dr. Wagner lays stress on the quality of the Crookes tubes employed and on the duration of the exposure. The more transparent the body it is desired to photograph, the shorter must be the exposure; in order, therefore, to obtain successful shadows of calculi, the exposure must be shorter than that required for the vertebræ and pelvis. Dr. Wagner hints that failures in the past may have resulted from the attempt to photograph calculi as well as the bones, at the same time and on the same plate.—*Centralbl. f. Chir.*, Leipzig, 25th February 1899.

TUNNELISATION OF THE PENIS IN THE TREATMENT OF HYPOSPADIAS.

TUFFIER of Paris reports a case of peno-scrotal hypospadias in which he employed the procedure which in France is associated with the name of Novè Josseraud. The glans was imperforate; the urethra opened on the inferior aspect of the penis, at the junction of the latter with the scrotum. The glans being put on the stretch, a long narrow bistoury was pushed into its centre, in the situation of the dimple where the urethra should have opened; the knife was made to traverse the whole length of the penis, approximately in the line of the septum between the corpora cavernosa, and was made to emerge at the fistulous opening at the root of the organ; a tunnel was thus made in the position of the urethra. The knife was then withdrawn, and the bleeding was arrested by pressure with the fingers. Meanwhile a Thiersch graft was cut from the inner surface of the left upper arm, 10 cms. in length and 2 cms. in width; the graft was then wrapped round an oiled bougie, with its raw surface exposed and fastened to the bougie by a catgut thread at either end. The bleeding from the wound in the penis having ceased, the bougie enveloped by the graft was inserted into the tunnel already made, so that one end projected from the opening in the glans, and the other from the fistula at the root of the penis; the excess of bougie was cut off with scissors, the catgut thread at the anterior end of the graft was divided, and the circular edge of the tubular graft was stitched to the edges of the wound in the glans, *i.e.* the site of the future meatus. A catheter was secured in the bladder and emerged at the fistula at the peno-scrotal junction, and through it all the urine escaped. On the third day the bougie was carefully withdrawn by the meatus, after cutting the catgut thread round the graft at its posterior end; the catheter was allowed to remain until the seventh day, thereafter the patient made water by the fistula. On the tenth day the new urethra was dilated with bougies Nos. 15 and 16 (French scale); this was repeated every second day until a No. 19 was easily passed. At a later period the fistulous opening was closed by a plastic operation, and the patient then made water by the meatus in the natural way. On separating the lips of the meatus, one could see the white epidermis lining the canal of the urethra. We have described the above interesting procedure in detail, as it illustrates an application of Thiersch grafts which is capable of being utilised in other parts of the body.—*Ann. d. mal. d. org. génito-urin.*, Paris, April 1899.

THE PREVENTION OF THROMBOSIS IN THE VEINS OF THE LOWER EXTREMITY AFTER ABDOMINAL OPERATIONS.

MOST surgeons will have met with cases in which the veins of the lower extremities have become the seat of thrombosis, some two or three weeks after a laparotomy or herniotomy, in spite of the operation having been a successful one, and in spite of the wound healing by first intention. Lennander of Upsala has devoted some attention to this subject. He has observed that the thrombosis may affect the superficial or deep veins, not infrequently the femoral vein, with extension into the external iliac, and it may be as high as the vena cava. The complication is one to be avoided, because, in addition to the risks of embolism, it entails the patient being confined to bed for a very much longer period than would be otherwise required, and, through the swelling and disability of the leg, it may be the cause of long-standing inconvenience. In a large series of simple operations for relapsing appendicitis, the author has met with thrombosis in no less than five cases, in three of which the veins affected were those of the *left* lower extremity. If there be an infective element in the production of the thrombosis, he is more inclined to suspect its origin from the alimentary canal than from the operation wound. He believes, however, that the thrombosis is chiefly due to mechanical causes, to the depression of the circulation, and the slowing of the blood stream in the lower extremities in patients who are exhausted, and who are kept in bed after abdominal or other operations. The return circulation from the lower extremities will be also hindered in those who are already the subject of varicose veins, of weak hearts, of meteorism of the belly, of feeble inspiratory powers, and of anæmia. He was much interested by the observation that thrombosis was very rare after severe complicated abdominal operations; the explanation appeared to be that in such cases the foot of the bed was always raised some ten or eighteen inches, partly to alleviate the bloodless condition of such patients, and partly to facilitate the absorption of the salt solution which had been introduced into the peritoneal cavity after the operation had been completed. He therefore concluded that the occurrence of thrombosis might be prevented by favouring the outflow of venous blood from the lower extremities. Since July 1897 he has raised the foot of the bed after all operations within, or in the region of, the abdomen, and he has not observed thrombosis, except in one case, that of a student operated upon successfully for relapsing appendicitis, in whom, for some reason or other, the raising of the foot of the bed was omitted. Where the heart's action was weak, and the blood pressure was low, recourse was also had to stimulants, to infusions of salt solution, etc. Care was also taken that the bandages did not compress the saphena or femoral veins. Where thrombosis is threatening, it is a common practice to elevate the affected limb; Lennander points out that this is quite different from raising the foot of the bed: in the former the territory of the upper third of the thigh and of the pelvis are still dependent, whereas in the latter there is a uniform descent or incline from the foot to the right auricle, or at any rate to the inferior vena cava.—*Centralbl. f. Chir.*, Leipzig, 13th May 1899.

ASEPSIS AND ANTISEPSIS IN RYDYGIER'S CLINIQUE.

RYDYGIER differs from most of his colleagues on the Continent in not having altogether discarded the antiseptic for the aseptic methods in surgical practice. Among other considerations he is influenced by his position as a teacher of future doctors, who will have to practise in small towns and in the country, where the rigorous technique required for successful asepsis is rarely practicable. His dressings are sterilised in the usual way by steam. The instruments are taken as required from the soda solution in which they have been boiled. Silk, which is rarely used, is boiled in 1 to 20 carbolic solution before each operation. Catgut is sterilised by exposure to dry heat (140° C.) for three or four hours; just before the operation it is immersed in alcohol, as it is damaged by any contact with watery solutions. The wound area is disinfected, after the usual washing, with 50 per cent. alcohol and 1 to 1000 corrosive sublimate. The hands of the operator and assistants are scrubbed with glycerin soap and running hot water for ten minutes; they are then immersed in 50 per cent. alcohol, and finally in 1 per cent. corrosive sublimate for two minutes; the latter is got rid of by washing in sterilised salt solution. The finger-tips are specially scrubbed with iodoform gauze preserved in sublimate lotion. During the operation the hands are frequently rinsed in saline solution. Rydygier regards thread gloves as dangerous, and will have nothing to do with masks for the face; he is content with washing his face, wetting his hair and beard, rinsing out the mouth, and gargling the throat, before operation. On account of the risk of air infection, he washes out the wound from time to time during the operation, and after it is completed, with sterilised salt solution. He rarely has recourse to drainage.—*Wien. klin. Wchnschr.*, 1898, No. 44.

A Patient's Device for Paralytic Incontinence of Urine.

Dr. Otto Kiliani related the following case to the Surgical Society of New York:—The patient at the age of 29 sustained an injury to the spine, attended with complete paralysis of the lower extremities, the rectum, and bladder. The legs improved sufficiently for him to walk about; he regained control of the rectum, but suffered greatly from incontinence of urine. He wore a portable rubber urinal for ten years. As this proved unsatisfactory, he discarded it in favour of an ordinary carpenter's screw-nail (1½ in.), which he screwed into the orifice of the prepuce, the latter being quite insensitive. He came under the author's observation for perforating ulcer of the foot after he had used the screw for six years. The margin of the prepuce was hard, thick, and almost cartilaginous, without the slightest evidence of ulceration. The orifice had contracted to a small opening, which, throughout its entire length (¾ in.), bears a thread corresponding exactly to the thread of the screw, so that it only admits the latter when properly started. The sac of the prepuce has become dilated, so that it has a capacity of 200 c.c., and the screw fits so exactly that it keeps the patient dry up to the pressure of this amount of urine; the prepuce, therefore, acts as a urinal or a secondary bladder. Dr. Kiliani had an ivory screw made to replace the steel one; the latter was exhibited to the members of the Society.—*Ann. Surg.*, Phila., May 1899.

The Treatment of Psoriasis of the Tongue.

Dr. Ransohoff of Cincinnati has carried out very successfully the treatment of lingual psoriasis by decortication of the affected areas of the tongue, in cases which had resisted large doses of potassium iodide, arsenic, and all kinds of local applications. Most surgeons will agree with the author in the view that the use of strong caustics may play a part in the subsequent development of cancer. Under morphine and chloroform narcosis, the mouth is kept open by a gag, the tongue is drawn out by a suture as in excision of the tongue by Whitehead's method. With a knife an incision is carried through the normal mucosa around the entire circumference of the patch; with curved scissors, the diseased mucosa and the underlying muscular bundles are excised—the bleeding is easily controlled by pressure. The raw surface is then powdered with permanganate of potash. Healing is complete in three weeks, and the resulting scar is scarcely visible and quite sound. Smaller patches may be removed under cocaine anæsthesia.—*Ann. Surg.*, Phila., May 1899.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Full-term Pregnancy and Two Months' Abortion in the same Woman, with Two Days' Interval.

Edwin Williams (*Memphis Lancet*, February 1899) reports the case of a primipara who had a normal delivery and forty-seven hours later had a slight rigor, the temperature rising to 100°·5, and the pulse to 106, with severe cramping pains in the uterus. It was determined to curette, but before doing so a bimanual examination was made, and immediately afterwards a crushed 2-months' fœtus was expelled. A thorough examination was made, when it was found that the uterus was divided into two unequal parts by a septum about $\frac{1}{10}$ in. thick, extending from the internal os to the fundus. Each tube and ovary communicated with one side of the uterus only, and the larger cavity occupied about four-fifths of the uterus.

A Case of Sudden Death in Labour.

W. P. Hazen (*Virginia Med.*, semi-monthly, January, 1899) reports the case of a woman, æt. 28, a secundipara, strong and healthy. During pregnancy her health was good but for slight œdema of the feet and ankles, associated with a faint trace of albumin in the urine, not sufficient to indicate kidney trouble. Labour began at 8 P.M. and progressed normally; at 1 A.M. the head was on the perineum, when forceps were advised, but refused by the patient. Suddenly she had a severe spasm of coughing, expectorated some frothy mucus, blood-tinged, and said, in a calm voice, "I believe that I am dying," and fell back dead. The child was delivered dead. No post-mortem was obtained, and the writer, who had been her physician for seven years, during which time she enjoyed perfect health, believes death was due to œdema of the lungs.

Three Conservative Cæsarean Sections on the same Patient.

Pollak (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 15) refers to cases where this operation has been repeated on the same patient. He has collected thirty cases where it has been twice performed—

Twelve cases, ...	Three times.
Four ,, ...	Four ,,
One ,, ...	Five ,,

Most of those cases were terminated with Porro's operation.

Pollak reports the following case:—Patient, æt. 19, admitted to hospital April 1894; last menstruation, August 1893; fœtal movements, January 1894. Pelvic measurements—

Interspinous,	25 cms.
Intercostal,	26 ,,
Intertrochantic,	31 ,,
Conj. diag.,	9·5 ,,
Conj. vera,	7·5 ,,

Labour induced by introduction of bougie, turning, and perforation of after coming head.

June 1896.—Patient again admitted in labour; last menstruation, 25th August 1895; Cæsarean section; living child. Again admitted on 8th June 1897, although patient was advised to report herself at an early period of pregnancy. Last menstruation, middle of September 1896; fœtal movements felt January 1897; on 25th June 1897, Cæsarean section. On January 1899 the operation was performed for the third time, as both children from former operations had died; recovery with living child.

Pollak found the uterine wound from the first two operations firm, with no appearance of thinning of the uterine wall at this part. He quotes Löhlein and Winckel, who think that there may be thinning of the wall sufficient to cause subsequent spontaneous rupture of the uterus. He emphasises the importance of the silk suture, as cases are recorded of spontaneous rupture where silver wire had been used to close the uterine wound.

Eclampsia—Post-Mortem Cæsarean Section—Living Child.

König (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 16) quotes the opinion of Dohrn that the chances of a living child under such conditions are very slight, the prognosis being better where the mother's death is sudden—from hæmorrhage, or the result of an accident. König has collected from the literature five cases of post-mortem Cæsarean section in eclampsia, with the following result for the child:—

First case,	Child died in fourteen days.
Second ,,	,, ,, ,, twenty-four hours.
Third ,,	,, ,, during extraction.
Fourth and fifth,	,, lived for lengthened period.

He reports the following case:—Patient, æt. 25; primipara; œdema, with albuminuria towards end of pregnancy; marked strumous enlargement of glands of the neck; became suddenly cyanosed; at first thought to be associated with the enormous glandular swellings. Fits followed, eclamptic in character; cervix closed; as the fits continued, Cæsarean section decided on. Patient became comatose, and died when on operating table; living child rapidly extracted. König believes that the first eclamptic attack may have caused hæmorrhage into the glandular enlargement of the neck, which pressing on the trachea had caused sudden asphyxia.

ABDOMINAL SECTIONS IN THE WESTERN INFIRMARY, GLASGOW, FROM 1894 TILL 1897.

PROFESSOR MURDOCH CAMERON (*Glasgow Hosp. Rep.*, 1898, vol. i.) gives a tabulated statement of the abdominal sections he performed in three years at this hospital. Forty-seven cases were thus treated, with two deaths. Some of the more interesting cases are described in detail. Two of those are worthy of special notice.

First, a case of pregnancy, complicated by multiple fibromyomata, one of which completely filled the true pelvis. During the fifth month, the abdominal distension was so great, and pressure symptoms so urgent, it was decided to operate. Pan-hysterectomy was performed after removal of the fœtus, through an incision in the anterior uterine wall. The patient made an excellent recovery.

The second case was a gravid retroversion of the uterus at the eighteenth week, which from incarceration in the true pelvis gave rise to severe pressure symptoms and complete urinary retention. Abdominal section was performed, and the uterine body lifted up into the abdomen. The patient made an uninterrupted recovery, and was delivered of a large healthy male child at term. The operation was complicated by the enormous distension of the bladder. The abdominal incision, even after being prolonged above the umbilicus, failed to open into the peritoneal cavity. The bladder was therefore incised extra-peritoneally, and emptied of blood-stained urine and clot.

Dr. Cameron is to be congratulated on his results, and has given an example, by the publication of his hospital work, which we trust may be universally followed by similar institutions. One is struck on perusing the table at the absence of any operations for inflammatory affections of the appendages, such as pyosalpinx, etc.

THERAPEUTICS.

UNDER THE CHARGE OF

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ACTION OF DIPHTHERIA TOXIN ON THE HEART.

ROLLY (*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1899, Bd. xlii. S. 283) has studied the action of diphtheria toxin on the heart of frogs and mammals. He points out that the most prominent action of the toxin when given to animals is the gradual fall of blood pressure, and failure of the circulation; and in man this is also seen, and is commonly spoken of as heart failure. It is, however, not confined to the heart alone, but includes the vasomotor system, the fall of pressure being largely due to implication of the vasomotor centre.

In rabbits Rolly used doses which killed in twenty-four or twenty-five hours—that is, about twelve to twenty times the minimum lethal. No special symptoms were visible till about twenty hours had elapsed, when they rapidly became apathetic and depressed; the blood pressure fell very rapidly at the end, and caused death. At first this fall is vasomotor in origin, but later the heart itself becomes implicated and greatly weakened. The respiratory centre is affected, but in a less degree, and artificial respiration does not affect the lethal result. The action on the heart is direct and quite independent of the central nervous system, but it is only very slowly developed. Probably the poison is gradually absorbed and retained by the heart muscle, and only affects it after a certain amount has been so absorbed.

THE EFFECTS OF BATHS, MASSAGE, AND EXERCISE ON THE BLOOD PRESSURE.

EDGECOMBE and BAIN (*Journ. Physiol.*, Cambridge and London, 1899, vol. xxiv. p. 48) have used the hæmadynamometer of Oliver to observe the influence of various physical agents on the blood pressure in man. To ascertain the effects of temperature, cold, warm, and hot water baths were employed; also the Turkish, Russian, and sitz bath. The action of the needle bath and douches were also studied, as well as saline, sulphur, and artificial Nauheim baths. Wet and dry massage, and severe and gentle exercise, complete the list. The conclusions are as follows:—(1) Cold baths of plain water raise the arterial pressure and lower the venous pressure; after reaction, the arterial pressure falls and the venous rises. These results seem to depend on change in the peripheral resistance. The cold needle bath has a more pronounced effect. (2) Hot baths lower both arterial and venous pressure. This seems due to dilatation of all the vessels and consequent increased capacity. (3) Turkish baths lower the arterial and venous pressure to a still greater extent. The pulse-rate is greatly increased. Besides the vascular dilatation, there is probably a diminished output of the heart. (4) Saline baths at warm temperatures lower the arterial pressure to a greater extent than plain water baths at the same temperature. The artificial Nauheim bath is still more active. (5) Dry massage lowers the arterial pressure and raises the venous pressure, provided the abdomen be not massaged too vigorously; if this be done, a rise occurs in both. The factor affected seems to be only the peripheral resistance, the heart output remaining unchanged. The first result is due to peripheral relaxation, the second to dispersal of blood from the splanchnic area to the systemic circulation. (6) Warm water plus massage (Aix douche) lowers the arterial and raises the venous pressure to a greater extent than dry massage. (7) The effect of exercise on the blood pressure depends on the severity of the work done. In all forms there is an initial rise. If the exercise be mild, so as not to affect pulse and respiration, a fall occurs; if severe, the initial rise becomes increased. After exercise a fall takes place. The venous pressure is raised all through.

ACQUIRED IMMUNITY TO THE POISON OF BEES, ETC.

JOSEPH LANGER (*Arch. f. Dermat. u. Syph.*, Wien, 1898) gives some very interesting information regarding the pathology of the bites of poisonous insects, and especially as regards the question of natural or acquired immunity to their venom. The intensity of the reaction to their attacks depends partly on the sensitiveness of the individual and partly on the size of the dose. Out of 164 bee-keepers, eleven were immune to stings, 153 were sensitive. Out of these 153, twenty-seven remained as sensitive as at first, while 126 became more or less immune. After being stung by a bee, the local lesion may be divided into three stages—(1) A stage lasting one and a half to two hours, when there occur pain, punctate bleeding, wheals, and swelling; (2) a stationary stage of one to one and a half days, during which the swelling remains; and (3) slow absorption, lasting eight to fourteen days. In certain people the local symptoms are extremely severe, and faintness, collapse, rigors, vomiting, diarrhœa, severe palpitation, and even death may occur. The more quickly the sting is extracted, the smaller is the dose of the poison. In midsummer, when the weather is hot, more poison is secreted than at other times.

Bee-keepers, owing to being frequently stung, gradually acquire a more or less high degree of immunity both to the local and general action, but it varies greatly in amount. This acquired immunity often disappears; sometimes so rapidly, that in the following spring the first stings produce a sharp reaction. An acute illness often causes loss of immunity also.

Elimination of Sodium Salicylate and Potassium Iodide by the Synovial Membranes.

Gaglio (*Arch. di farm. e terap.*, Palermo, 1898) has sought to prove that the value of these two drugs in certain joint affections depends on the fact that they are excreted by the synovial membranes. On giving repeated small doses of salicylate of sodium to dogs by the mouth, and then withdrawing a few drops of synovial fluid from one of the joints, the latter gave a violet coloration with ferric chloride. This reaction occurs very rapidly after administration. The salicylate seems to disappear in a short time, as none could be found in the joint forty-eight hours after administration of a large dose. Gaglio supposes that an action is exercised on the organisms or toxins in the joints.

Potassium iodide can also be detected in the joints after being given by the mouth.

Influence of Certain Drugs on the Formation and Excretion of Uric Acid.

Bohland (*München. med. Wchnschr.*, 18th April 1899) contributes a paper on this much discussed subject. The generally accepted theory of the formation of uric acid is that of Horbaczewski, according to which uric acid is formed from the splitting up of nuclein. Thus, if spleen pulp be digested with oxygenated blood, uric acid is formed, and the administration of nuclein in the form of thymus gland of the calf is followed by increased uric acid excretion. As the result of many physiological and pathological observations, Horbaczewski came to the conclusion that the nuclein is normally derived from the rapid destruction of the leucocytes. He further holds that between the number of the leucocytes in the blood, and the amount of uric acid excreted, there is a direct relationship, and that increase in the number of leucocytes causes increased secretion of uric acid.

Bohland has been investigating this point. He availed himself of the fact that many drugs cause variations in the number of leucocytes. Thus tannic acid, quinine, ergot, camphoric acid, atropine, all diminish the number; while antipyrin and phenacetin increase it. He finds, however, that the relationship between the number of leucocytes and the amount of uric acid excreted does not hold. Thus atropine, sodium salicylate, pilocarpine, quinine, fit in with Horbaczewski's theory, but phenacetin and antipyrin cause hyperleucocytosis without increase of uric acid, and camphoric acid causes hyperleucocytosis without altering the uric acid. Bohland finds that the leucocytes merely become redistributed under the action of these drugs. Thus, pilocarpine causes the leucocytes to appear in the peripheral circulation, while atropine causes them to concentrate in the lungs.

Bohland considers that the action of these drugs on the uric acid is owing to their direct effect on the metabolism of nuclein. Thus, pilocarpine and sodium salicylate increase the uric acid formation, while atropine, tannic acid, and quinine cause further oxidation into urea and allantoin. In support of this view he adduces the following facts:—The thymus glands of a calf is very rich in nuclein, and its administration in 500-gr. doses caused increased uric acid formation. If, however, along with thymus, tannic acid be given, the increase in uric acid does not occur. The inhibiting power of quinine is much less marked. Bohland thinks this action of tannic acid might be made use of in gout and cases of uric acid diathesis, where it is advisable to limit for a time the formation of uric acid. Unfortunately, the system soon becomes accustomed to the drug, and the dose must be largely increased or another drug tried.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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SYPHILIS AND THE LIVER.

ADAMI (*New York Med. Journ.*, 22nd April 1899) discusses this subject in an interesting way, in the form of a short review of the various syphilitic lesions met with in the liver, both in the new born and in the adult. The former (the congenital variety) is by far the more frequent; indeed, the liver is affected in about nine-tenths of the cases of congenital syphilis, whereas in post-natal or adult syphilis it is but rarely seen, although he doubts if it is quite so rare as statistics would seem to show, namely, one in about 370 cases. The reason for this remarkable difference in frequency is doubtless to be found in the anatomical position of the liver in relation to the circulation on the one hand, and the delicate, untrained, and susceptible nature of the fœtal liver cells as compared with those of the adult on the other. In the fœtus the maternal blood from the placenta travels through the liver before it enters the general circulation, and the liver cells are only as it were beginning their life-work as blood-purifiers, and hence are more easily affected by injurious substances. He classifies the lesions met with in the congenital variety as follows:—(1) Well-defined gummata, easily seen by the unaided eye, sometimes as large as an almond; (2) miliary gummata, invisible or just visible to the unaided eye, with generalised fibroid change affecting circumscribed areas of the liver; (3) an admixture of miliary gummata and generalised fibroid affecting the whole organ; (4) generalised atrophic cirrhosis, giving rise to a granular and contracted organ, and causing œdema and icterus during life. No. 2 is the commonest form met with, the circumscribed areas of change varying greatly in size in different cases. No. 3 may be looked upon as a more extended and widely distributed condition of 2. The pericellular nature of the fibroid change—for it will be remembered that the newly formed fibrous tissue appears as a thickening of the lobular capillary walls—suggests that the syphilitic poison circulates within the portal capillaries, either in the form of germs, their toxins, or both; that the change follows upon the attempted removal of the germs from the blood by the endothelium of the blood vessels themselves and the adjacently lying liver cells, or that it is the circulating toxins of the disease which cause the disturbance. With regard to post-natal syphilis, the writer first refers to the secondary stage, and notes that we are still without satisfactory evidence what influence, if any, it exerts upon the liver. It is highly probable that it does produce changes of importance of a more or less fleeting character. He instances the profound granular degeneration of the liver cells which occurs after the injection of a dose of the toxins of *Bacillus coli communis*, and clears up and disappears within a few days. In the tertiary stage, on the other hand, the lesions are well known and extensively studied, with the important exception of the arterial changes. A knowledge of these changes is still a desideratum. He thinks that the classification given above holds equally good here also, the changes being practically similar. The obvious gumma is undoubtedly the most characteristic and common of these changes, and may be represented in the active, quiescent, and obsolete forms. In the first there is round-cell proliferation and infiltration of the liver tissue beyond the margin of the gumma; in the second it is imprisoned within a well-formed capsule of fibrous tissue, without sign of active change beyond; and in the last it has become entirely absorbed, leaving only a cicatrix. The tendency is for the formation of gummatous centres or deposits, but he thinks that a diffuse or generalised fibrosis may arise without any such deposits. Here, as in the fœtal condition, the fibrosis is probably secondary to a parenchymatous degeneration.

SIGNIFICANCE OF ABSENCE OF NUCLEATED RED CORPUSCLES IN THE BLOOD IN CASES OF GRAVE ANÆMIA.

J. S. BILLINGS, Jr. (*New York Med. Journ.*, 20th May 1899), from a study of a certain number of cases, particulars of four of which he gives, comes to the conclusion that the absence of nucleated red blood corpuscles in cases of severe anæmia is probably a grave sign. He defines the extent of the anæmia to be cases in which the red blood corpuscles are under 150,000. He argues that, as the marrow of bones is the natural blood-forming organ in health, it will in cases of anæmia have greater calls made upon it. In health all its red blood corpuscles lose their nuclei before escaping into the general circulation, but in anæmia it is called upon to produce them so rapidly that some must escape into the blood before losing their nuclei. Hence their absence in the case of grave anæmia probably indicates a very feeble power of repair in the part of the bone marrow, and a rapidly fatal termination of the case. He says it is necessary to use a mechanical stage and to make a very thorough millimetre search for them through at least ten cover-glass specimens. If the blood be smeared on the slide instead of the cover-glass, three specimens will do. He has succeeded in finding them at the fifth or sixth attempt, after failing in the previous specimens. Their presence does not afford any evidence one way or the other, but their absence he thinks justifies a fatal prognosis.

THE INFLUENCE OF SUNLIGHT ON TUBERCULOUS SPUTUM.

MITCHELL and Crouch's paper on this subject (*Journ. Path. and Bacteriol.*, Edin. and London, May 1899, p. 14) comes at an appropriate time. They found that very few direct experiments in this direction had hitherto been recorded, and that the results of those which had been recorded were both meagre and contradictory. Thus, material containing the tubercle bacillus or tubercular sputum, when exposed to the action of sunlight, is, according to Feltz, still virulent at the end of 137 days; according to Koch, the bacillus is killed in from a few minutes to several hours; according to Mignaceo, from twenty-four to thirty hours. The authors' plan of procedure was as follows:—The morning sputum of a patient in the second or third stage of phthisis was allowed to remain for two hours in a sterilised filter paper and funnel, so as to drain off as much of the saliva as possible. It was stirred with a sterile glass rod, to make it as homogeneous as possible. Care was taken to select a sputum free from all other bacteria than tubercle, so as to avoid the risk of septicæmia following upon its subsequent injection into the animals experimented upon. Four grms. of this sputum were then weighed, placed on a sandy soil, and exposed to the sun's rays. The soil was placed on the lower half of a Petri dish, and sterilised for two hours at 150° C. Care was taken to select bright sun only, and the times of exposure carefully noted, the sputum being in the intervening intervals kept in the dark. The hours of exposure were as follows—1, 2, 4, 7, 10, 15, 20, 25, 30, 35, 45, and 55, and the time taken to obtain the 55 hours of sunshine was from 28th September to 22nd October 1897. Two guinea-pigs were inoculated with the sputum of each exposure, and control experiments were made. At the autopsies of these animals, sections were made of one or more of the organs, and examined for the tubercle bacillus, and, provided this test failed, sections were stained and studied histologically. They summarise their results as follows:—(1) That the tubercle bacillus, as expectorated on a sandy soil, is still virulent after thirty-five hours' exposure to the direct rays of the sun in the high altitude of Denver; (2) that such sputum has suffered but little appreciable diminution in virulence after twenty hours' exposure; (3) that after twenty to thirty-five hours' exposure, the virulence is gradually diminished and finally lost, if the exposure extends beyond the last-mentioned time. The conclusion which they draw as to the infectiousness of sputum, as expectorated by consumptives in this altitude, while engaged in their daily avocations, is that such sputum has ample time to become desiccated and blown in the atmosphere, before being robbed of its infective power, if inhaled by susceptible individuals. They therefore think that these experiments are ample warrant for a greater degree of precaution in the disposal of tuberculous matter.

THE PARASITE OF MALARIA IN THE TISSUES IN A FATAL CASE OF BLACKWATER FEVER.

THIN (*Brit. Med. Journ.*, London, 3rd June 1899, p. 1325) has made an important contribution to this subject, in the light of the recent operations of Koch, that blackwater fever is really due to quinine poisoning. The organs examined were taken from the case of a young man, and included parts of the brain, liver, spleen, and kidney, sent in alcohol to the writer by Dr. Kerr Cross from Africa. In his sections of the brain he had no difficulty in demonstrating that the parasite of malaria was present in the capillaries. The brain was, however, the only organ in which the parasite was found, and the liver and spleen were singularly free from the usual pigment seen in fatal cases of malarial fever. Some pigment was, however, found, having a peculiar distribution. He therefore believes that the parasite of the blackwater fever is the same as that of malaria.

ACTIVITY OF THE GONOCOCCUS—AN IMPORTANT POINT IN PROGNOSIS.

DROBNY (*Arch. f. Dermat. u. Syph.*, Wien, October 1898) succeeded by means of a solution containing fifteen drops of carbol-fuchsine and eight drops of a saturated solution of alcoholic methylene blue in 20 c.c. of distilled water, in differentiating clearly the gonococcus from all other organisms which might be present. The protoplasm of the pus corpuscles is stained of a rose colour, the main substance blue, the epithelium red, mucous cells and mucus violet, the gonococcus a black, while all other organisms are blue. He confirmed the view held by most, that the gonococci were often extracellular, and found that, when so, the course of the urethritis is more severe and complicated than when they are entirely within the cells. He thinks that the extracellular position of the gonococci may point to a greater amount of virulence of the toxins, causing paralysis of the leucocytes.

ON THE PATHOGENIC ACTION OF BLASTOMYCETES.

SINCE Russell, the pioneer of this subject, first drew attention to the presence of "fuchsin bodies" in cancers, much work has been done and great interest taken in the subject. Ruffer and Plimmer's elaborate and careful observations went far to establish those bodies as protozoa. Then came the work of Stiles and others, which seemed largely to overthrow this view, explaining them as being mainly degenerations of cell inclusions or nuclei. Recently, further evidence in support of the "yeast" nature of these bodies has been brought forward by Sanfelice and Roncali; and Russell, in the *Lancet* (April), with a pardonable note of triumph, has given a review of the whole subject. Thus Sanfelice reports (*Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1898, Bd. xxiv.) that by the inoculation of *Saccharomyces neoformans* he has produced a typical adeno-carcinoma in the mamma of a bitch and in the testicle of a dog. He promises exact details in a future paper, which has not yet appeared. Roncali (*ibid.*) describes a yeast, *Blastomyces vitro simile degenerans*, isolated from a case of actino-carcinoma of the colon, and notes that he has isolated the same yeast from other two cases of malignant disease, namely, an epithelioma of the tongue, and a sarcoma of the mamma. Inoculation of guinea-pigs with this yeast resulted in the formation of granulomata only. Foulerton has studied some of the commoner yeasts, and gives a short review of previous works and the results of his own experiments in a timeous paper (*Journ. Path. and Bacteriol.*, Edin. and London, May 1899, p. 37). His experiments were undertaken with a view of testing the virulence and tumour-producing power of *S. cerevisiæ*, *S. pastorianus* (1, 2, and 3), *S. ellipsoideus*, *S. albus*, *S. albus liquefaciens*, *S. anomalus*, *S. albicans*, and a red yeast isolated from some fæces in a case of enteric fever. He also, in a second series of experiments, used a hitherto undescribed yeast, which was isolated from the mucus of the throat in several cases of pharyngitis. In all the experiments of his first series, the inoculated material consisted of an emulsion, made by shaking up with 3 c.c. of sterile normal saline solution 22 c.c. of a forty-eight hours' old culture of the particular yeast, in a sloped glucose agar tube. In every case the dose used for inoculation was 1 c.c. for a rabbit and 0·5 c.c. for a guinea-pig. Glucose agar tubes were used for all subcultures from the tissues. The results of his first series he gives in the form of a table, and they may be synopsised as follows:—Out of twenty-three animals, inoculated with one or other of the yeasts mentioned above, a local tumour at the seat of inoculation was observed in eight of them; secondary nodules were found thrice, twice in the lungs and once in the liver. Yeast cells were identified in sections of most of these tumours. Generally, it was more satisfactory to examine freshly teased-out tissue than stained sections. Cultures of the yeast were obtained from the tumour in several instances. In no case were yeast cells found in the blood or organs. His second series was performed with the pathogenic yeast above mentioned, to which he has given the name *Saccharomyces tumefaciens albus*. An average-sized cell from a forty-eight hours' old culture of this yeast measures 3 to 4 μ in diameter. In artificial cultures the cells always appeared in yeast form and have never shown mycelial formation. Each cell has one, sometimes two, highly refractile nucleus, and often a central vacuole, around the edge of which the nucleus appears to move in the living state. Reproduction takes place exclusively by budding. Cultures ferment glucose energetically, maltose less rapidly, and lactose not at all. It grows in all the ordinary media, and best at 37° C. Its pathogenic action was tested on rabbits, guinea-pigs, tame rats, and tame mice. The rabbits gave the best results. Six were inoculated in the subcutaneous tissue and six in the muscles, and, of these, three died within ninety-six hours, and in each case a mass of semi-solid material was found at the site of inoculation, in which yeast cells were numerous. Seven died between the seventh and fourteenth day and one survived to the fifteenth. In all these there was a definite tumour at the site of inoculation, and in seven of them pure cultures of the yeast were obtained from the growth; secondary tumours were found in five of these cases. All these tumours, both primary and secondary, were histologically granulomata, round nucleated cells, with a varying amount of homogeneous fibrinoid ground tissue. A few very large cells containing several yeast cells were seen. They did not correspond morphologically with the typical "giant cell." Staining methods for demonstrating the yeast cells were not satisfactory. They alter the shape of the yeast cells. "Pseudo-mycelial" forms were frequently met with, namely, irregularly contoured bands, in which only a constriction here and there indicated the origin of the band in a continuous chain of yeast cells. Various other degenerative changes were seen. None of these degenerative changes occurred in the secondary tumours. No morphological distinction between one species of yeast and another could be made out in the stained sections. The author thinks, then, that it is not impossible that some, at any rate, of the sarcomata may prove to be really cases of yeast infection.

DERMATOLOGY.

UNDER THE CHARGE OF

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The Treatment of Disease by Light.

The injurious action of certain of the rays which compose the spectrum has been recently studied by various observers, but the idea of turning their deleterious effect into a curative one has in the main emanated from a thoughtful Dane, who has published his results in a small and very interesting book ("La Photothérapie," par N. R. Finsen. Paris, G. Carré et C. Naud, 1899). The first of the three monographs which make it up deals with a new treatment for variola, introduced by the author in 1893. This consists in placing the patients in rooms from which the chemical rays of the solar spectrum are excluded, by interposing red glass or thick red cloth. The result, speaking generally, is that the vesicles do not go on to suppuration, and recovery is effected without scarring, or should this occur it is slight. To understand this, one must be acquainted with the way in which the chemical rays are harmful. These are essentially situated in the blue, violet, and ultra-violet part of the spectrum, and are the most refrangible of the luminous beams. The chemical power is here at its maximum, the calorific at its minimum. The other extremity of the spectrum exhibits precisely contrary phenomena. It is well known that light exerts a destructive influence on most bacteria, and Downes and Blunt have shown that this is due, probably exclusively, to the chemical rays; indeed, d'Arsonval and Charrin, in their researches on the *Bacillus pyocyaneus*, have demonstrated that they alone are hurtful. In the chameleon the alteration in colour to which it is subject arises from a change in situation of the pigment cells of the skin. In light these remain on the surface, in darkness they descend deeper. Bert noticed that in illuminating one half of its body by means of a red glass, and the other by a blue one, the colour of the reptile became nearly immediately black under the blue, while it remained long white under the red. In man it is the chemical rays only, particularly the ultra-violet ones, which occasion eczema solare, or bronzing on exposure. Of these the erythema is the acute, the pigmentation the chronic phase of the cutaneous manifestation. One may consider pigmentation as a useful process, inasmuch as the colouring materials hinder the luminous rays from penetrating deeply, and so protect the skin against their inflammatory action. It is in spring that the skin is most readily affected, not because there are more chemical rays at that season, but because the epidermis is weakened, and the pigment which it contains lessened in amount by its being exhausted during the winter. In summer the skin has received its protective layer of pigment, and inflammation from this cause is less frequent. There are certain circumstances which may be urged in favour of the view that the action is exerted on the blood capillaries and on the blood itself. If pigmentation constitutes a defence against the chemical rays, the mode in which this is distributed in the tissues shows what part needs protection. In man it is deposited in the deep layers of the epidermis, where, it is true, there are no capillaries, but there are in the papillæ of the corium just below. In animals the pigmentary cells are more widely disseminated, and frequently there are layers of these cells round the cutaneous vessels. The rays, however, are only hurtful when acting in large numbers and for a long time. In pellagra and in the summer prurigo of Hutchinson, light exerts a manifest influence, since in these the erythema plainly develops under the beams of the spring sun. Nothing, therefore, is more natural than the occurrence of an injurious action of the chemical rays on the diseased skin, when such severe inflammations can arise through their influence on the comparatively healthy. Throughout medical literature are found scattered various allusions to the injurious effect of light on the course of smallpox, and reflection on these led Finsen to notice that it is on the face and hands—the parts most exposed—that the deepest and most extensive scars formed. This induced him to suggest the treatment of the variolous in rooms from which the chemical rays were excluded, by filtering the illumination through thick red curtains. Lindholm and Swendson in Norway treated eight cases, confluent on the face and hands, in this way. They found that "the period of suppuration—the most dangerous and painful —did not ensue; there was no secondary rise of temperature; the patients became convalescent immediately after the convalescent stage, which seemed long; and there were no cicatrices." Feilberg had the same experience, and noticed that the patients left hospital showing pigmentary or hyperæmic macules, but without loss of substance of the skin. It is to be noted that the methods in vogue to prevent scarring, such as painting with iodine or solution of nitrate of silver, partially protect the skin from light, by interposing a yellow or brown coating. It is singular that the same plan was long since arrived at empirically. Watson, in his "Practice of Physic," mentions that John of Gaddesden, in the fourteenth century, surrounded his half-suffocated patients with red curtains, red walls, red furniture of all kinds—everything they saw was to be red, for in that colour there was, John pretended, a peculiar virtue. Finsen also says, though he does not seem to have heard of John of Gaddesden, that this idea was prevalent during the Middle Ages. To obtain perfect results, the exclusion of the chemical rays must be absolute; thus the curtains must be thick and the glass a deepened red, though the exact tint has not yet been scientifically determined. As much care as is taken in photography is necessary. The lamps or candles used for examination or at meals should have red chimneys. The treatment should be continued without any interruption until the vesicles have completely dried up. Even a short exposure to daylight may give rise to suppuration and its results. To be effectual, the treatment should be commenced as early as possible in the disease. While preventive of scarring, the mortality, at least prior to the stage of suppuration, is not lessened by this treatment.

The second monograph deals with light as an agent of excitability. The eggs of the salamander, nearly at term, were subjected to the influence of the different rays of the spectrum individually, as contrasted with shade, and the movements of the fœtus counted. This proved that light possesses very remarkable properties of provoking movements residing specially in the blue-violet. Again, he placed a number of common earthworms and earwigs in vessels, with lids having glass windows, ranging through red, yellow, green, and blue. The animals soon placed themselves under the red glass, and on turning the lid round were speedily again beneath it. Butterflies put in a box whose cover was half red, half blue, beat their wings actively at first, but in a few minutes those under the red remained for the most part still, while those under the blue fluttered incessantly. We know the very special effect of the direct solar light on all organisms. The sudden transition from the cloudy sky to the clear renders this more evident than continuous sunshine. The sky has been obscured during part of a summer day, when all at once the sun breaks through. All nature changes as if enlivened; the insects fly and hum gaily; the reptiles dart about, the birds chirp, and we ourselves experience the impression of well-being and the fulness of life. One might regard this effect as that of a rouser of life, in the sense that it excites busy activity and provokes movement. While heat takes part in this, it would seem that the chief portion of the revivifying effect of light on the lower animals should be ascribed to the chemical rays. It may be possible to make practical use of this under the form of "baths of light," blue or violet, the strength and duration being varied.

THERAPEUTIC GLEANINGS.

THERE are some cases of lupus vulgaris which from their extent are unsuitable for such radical measures as excision, while those affected are, from the nature of their employment, unable to give up work for long periods. For these Ehrmann (*Wien. med. Bl.*, 12th January 1899) recommends a paste compounded as follows:—℞ Resorcini, 3·0; lanolini, 4·0; ung. simp. vel vaselini, 2·0—*M.* This is spread on linen, applied to the part, and changed night and morning. In course of twelve hours the lupus patches become greyish white on their surfaces. This superficial necrotic layer should be wiped off with cotton-wool, and the living tissue exposed. The application of the paste is continued for from eight to ten days. Complaint may then be made of slight pain. To relieve this, and to enable one to judge of the effect, the part should now be dressed for three or four days with boric ointment or lint. The whole surface then appears markedly smoothed down, and many of the lupus nodules have apparently disappeared. In most instances a repetition of the treatment is possible during weeks and months. The pain is never such as to confine to bed, seldom to the house; in many cases the occupation can be gone on with. The resorcin seems to exert a purely elective effect on the lupus nodules. This method enables treatment to be carried on during the winter, the patient pursuing his ordinary employment throughout the rest of the year, while advance of the ailment is kept completely in check. It is sometimes useful to have an application which can be readily spread on the skin, will dry speedily, does not occasion the sensation of warmth which oily substances are apt to produce, and which is a convenient vehicle for tar or ichthyol. This, Darier says (*Ann. de dermat. et de syph.*, Paris, December 1898), is accomplished by the casein varnish of Unna. This is composed of the ordinary casein of commerce, 14·0; potash, 0·35; soda, 0·08; glycerin, 7·0; vaseline, 21; oxide of zinc and carbolic acid, āā. 0·50; water, q.s. ad 100. In preparing this, the casein is carefully dissolved in the water and the alkalies added. The mixture is allowed to stand for twenty-four hours, so as to obtain a homogeneous mass, like mucilage of tragacanth. The vaseline is next melted by a gentle heat, and is incorporated with the mucilage by brisk rubbing. The glycerin and antiseptics are then added. It should be dispensed in collapsible tubes. It is a creamy liquid which spreads easily over the skin, drying in three or four minutes, leaving an elastic coating, adhering firmly, yet removable by simple washing. It is not irritating. It is particularly valuable as an excipient for tar, in the proportion of 10 to 20 per cent. But 1 per cent. of salicylic acid, 2 of resorcin, 5 of sulphur, and 10 of ichthyol or of pyrogallic acid can be similarly combined with it. The peculiar value of *potash as a caustic*, distinguished from other escharotics, consists in the persistent after-effects which follow its use. It has rather gone out of use, however, and this is partly ascribable to its painfulness, partly to its liability to encroach on sound tissue. Unna (*Monatsh. f. prakt. Dermat.*, Hamburg, 15th July 1898) finds that a paste thus composed can be perfectly limited in action:—℞ Kali caustici; calcar. ustæ; sapon. viridis; aq. destill., āā. pp. æq. If to this 10 per cent. of morphia be added, the pain only lasts for half an hour, lessening all the time in intensity, while the effect is as good. The sole condition is, that the paste must be kept moist, by placing over it pledgets of wet cotton-wool, and covering these with guttapercha tissue, or other impermeable material. The application may be continued for from six to forty-eight hours even, according as the epidermis is thin or thick, the tissue to be acted on is soft or fibrous. When removed, the epithelial covering is softened or melted away, and the cutis in places is partly or wholly ulcerated. One such burning is usually sufficient; the effect may be further and painlessly prolonged, by applying a simple evaporating dressing. In the same way, weak solutions of caustic potash, 1 : 10,000, can be employed to large areas of ulcerated lupus of the face, and, used under an impermeable covering, exert a quite remarkable absorptive action. It is often of importance to have a *dusting powder* of such a tint as can be used without observation. Unna (*ibid.*, 1st September 1898) has found what he calls his *pulvis cuticolor* of practical utility, since it approximates closely to the natural hue of the skin :—℞ Zinci oxidi, 2·0; magnes. carb., 3·0; boli alb., 3·0; boli rub., 2·0; amyli. oryzæ, 10·0—*M.* In order to render this very fine, it should be beaten through old linen. It is of special service in seborrhœic eczema of the face, in rosacea, and in hyperidrosis oleosa. Rausch (*ibid.*, 15th September 1898) extends the same principle to the *coloration of ointments* and of *pastes.* Thus he finds that 1 in 300 of red Armenian bole with a few drops of glycerin gives an agreeable flesh tint to zinc ointment, while the addition of a few drops of a weak solution of eosin, in addition, colours a zinc paste or a zinc sulphur paste quite pleasantly. Especially useful is a skin-coloured gelanthum varnish :—℞ Boli arm. rub., 0·02; sol. eosini rub. (1 : 500), gutt., 2; zinci oxidi, 0·4; glycerini, 3·0; gelanth., 20·0. This serves, used as a cosmetic, to protect delicate skins from the effect of weather. He has found it invaluable in the management of the troublesome and obstinate seborrhœa sicca of the face. The fine, white, disfiguring scales rapidly vanish if this tinted gelanthum is rubbed in, without any observable alteration in colour or vestige of irritation. *Tar* is a valuable but at the same time a treacherous remedy: in one case the most brilliant results follow its employment, in another and apparently similar one it sets up a troublesome dermatitis. Leistikow (*ibid.*, 15th October 1898) claims that benzol extracts the useful ingredients and leaves the harmful behind. In this way an extract of coal tar which he calls *liantral* is prepared. This may be applied pure in chronic dry eczema, and in rebellious cases of psoriasis, the parts being powdered after the liantral has been rubbed in. When used in a more dilute form, the casein varnish of Unna, mentioned above, forms the best vehicle, in the proportion of from 5 to 20 per cent. If desirable, a coating of zinc glycerin jelly can be painted on, which makes it still less irritating.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

G. H. MELVILLE DUNLOP, M.D., F.R.C.P.Ed.,

PHYSICIAN, ROYAL HOSPITAL FOR SICK CHILDREN, EDINBURGH.

Painful Paralysis in Young Children.

Bertrand, in his Thèse de Paris, 1898, gives a full account of the symptoms of this somewhat unusual condition. It is nearly always met with in children under 5 years of age, and commences suddenly, all the cases presenting the same characteristic features. As a rule the upper extremity is affected, and is found to be in a state of complete paralysis. The arm remains quite flaccid, and if one raises it and then lets it go it at once falls heavily and uselessly to the side. There is no anæsthesia, for if the skin is pinched the child immediately cries out. The least movement of the limb is painful, and the gentlest examination causes the child considerable distress. The pain and the paralysis appear to start simultaneously, and the onset of the affection seems to be instantaneous. The child has been playing or running about, when suddenly he screams loudly, and from that moment the limb is paralysed and any movement causes pain. Naturally one supposes that some acute affection of the bones or joints has occurred, but careful examination fails to reveal any signs of redness, heat, or swelling, or any lesion whatever. The paralysis and pain persist as a rule from one to two days; and, in the greater number of cases, at the end of this time some amelioration of the symptoms is noted. During the next twenty-four hours it is observed that the child cries less often, passive movements can be carried out without causing much distress, and in a few days all the painful symptoms have disappeared, and the child has regained the full use of the arm. It is generally difficult to determine with any exactness the seat of the pain, although movements of the shoulder-joint seem more often to elicit signs of suffering than those of any other joint. The arm generally hangs by the side in a state of pronation, with some slight flexion of the forearm at the elbow-joint. The author advances many possible explanations of this uncommon form of paralysis, but comes to the conclusion that the majority of the cases are due to the child being suddenly seized and roughly lifted up by the arms, which causes a stretching of some of the branches of the brachial plexus.—*Gaz. hebd. de méd.*, Paris, 18th March 1899.

TETANY IN CHILDREN.

THE only pathognomonic symptom of tetany, according to Morse, is spontaneous, intermittent, paroxysmal muscular contraction. He considers that the seat *par excellence* of these contractures is the muscles of the forearm, in which the positions assumed are very characteristic, the fingers being flexed at the metacarpo-phalangeal-joints, while the phalanges are extended, the thumb being strongly adducted, the wrist acutely flexed, and the hand turned to the ulnar side. The shoulder- and elbow-joints are seldom involved in the milder cases. He maintains that the term tetany should only be applied to cases where these contractures are present, and that cases of increased reflex excitability, where the contractures are absent, should not be regarded as examples of this condition. He admits that in association with the contractures other symptoms frequently occur, some or all of which are present in nearly every case, such as Erb's and Trousseau's symptoms, Chvostek's facial irritability, laryngospasm, and convulsions. In other cases, again, we may find sensory disturbances, including pain on movement during a spasm, or vasomotor and trophic disturbance, the most characteristic being œdema of the wrist and ankle. Many authorities clasthese symptoms, when occurring unassociated with contractures, under the heading of latent tetany. This definition the author considers a misnomer, for the reason that many of these symptoms, but especially laryngospasm, Trousseau's symptom, and Chvostek's facial phenomenon, are not constant in cases which show the typical contractures, and they also occur in many conditions in which there is no question of tetany. Hence they cannot be considered as pathognomonic of that disease, and do not, either singly or in combination, afford sufficient ground for the diagnosis either of tetany or latent tetany.

In discussing the etiology of this condition, he considers that the most plausible theory is, that there is no single pathological cause for tetany, but that, like epilepsy, it may arise from many causes. Like epilepsy, too, it must be regarded merely as a symptom and not as a disease. He considers that in gastro-intestinal disorders, in rickets, and in many acute diseases, toxic substances are generated which are capable of producing the characteristic symptoms. The action of these poisonous substances may show itself by a special modification, functional rather than organic, of the central or peripheral symptoms, and he considers that the various lesions of the nervous system found in tetany are not inconsistent with this conception of its production.—*Arch. Pediat.*, N. Y., March 1899.

NEPHRITIS COMPLICATING ACUTE AND SUBACUTE GASTRO-ENTERITIS OF CHILDREN.

KOPLIK of New York, in this paper, following in the footsteps of Escherich, Booker, Fischl, and Moser, demonstrates in a very convincing manner that intestinal disorders are not always to be regarded as a simple entity in children. While many of the cases described under the heading of summer diarrhœas run a simpler course and recover under various methods of treatment, others again assume an entirely different complexion, and develop lung and kidney complications, owing to absorption of infection from the intestines. According to Booker, who conducted at the Johns Hopkins Hospital a most elaborate series of experiments with regard to the bacteriology of diarrhœa, these conditions only supervene when streptococci are found in the stools replacing the *Bacillus coli* and the *Lactis aerogenes.* Koplik, regarding the matter from the standpoint of clinical experience, is inclined to doubt the importance of these streptococci in causing the complications referred to, because they do not always occur when streptococci are found in the stools, and because the percentage of cases in which they do occur is exceedingly small and incomparable with the number in which nephritis supervenes as a complication. The author leans to the opinion that the severe forms of intestinal disorders, complicated by pneumonia or nephritis of an acute or subacute variety, cannot be traced to any one set of bacteria, but rather to an absorption of toxin from the mucous membrane of the gut, infecting the whole system, and which is generated quite early from certain foci in the small intestine, and kept active by favourable conditions.

In many cases, after an infant has suffered for some days from a mild or severe attack of diarrhœa, signs of nephritis appear, adding certain distinct and characteristic symptoms to the picture of the disease, and the success of the treatment depends largely upon an appreciation of these facts.

These symptoms can be grouped in two sets, the first being general and inseparable from the primary disease, and the second traceable directly to the infection of the kidney. In the severe forms the patient is almost invariably very restless, and this restlessness can be traced to the disturbance of the function of the kidneys. Frequently a condition of stupor supervenes, often called hydro-encephaloid, which may either be due to the nephritic or toxic infection. Vomiting, which in the milder forms can be checked by one or two irrigations of the stomach, becomes persistent in the severe forms, and in by far the greater number of cases it is of uræmic origin. The first mark of improvement in these cases dates from the cessation, not of the diarrhœa, but of the vomiting. Another symptom frequently present is œdema of the skin, which is perhaps best demonstrated on the inner aspects of the thighs, which pit on pressure. There is often a doughy impression conveyed to the finger, and we have to press hard to obtain the pitting. The œdema in these cases is quite distinct from what is met with in ordinary cases of nephritis. There is frequently complete suppression of urine, and on passing a catheter only a few drops of urine can be collected, which deposits urates; and, on analysis, albumin, casts, blood, and renal epithelium are found. The albumin is small in amount, notwithstanding the presence of casts of all descriptions, which is difficult to explain, except on the supposition that certain chemical substances in the urine prevent full reaction.

In view of the peculiar physical signs and rapid improvement of an almost complete suppression, without leaving behind any lesion of the kidney, as evidenced by albumin, casts, etc., it is seen we are not dealing with an ordinary nephritis. Koplik advances the explanation that, owing to the immense loss of fluid, the toxins circulating in the kidneys are in a very concentrated form, but as soon as the fluid drained from the system is partially restored, these poisons are washed out of the kidney, and the functions of that organ return to their normal activity. Bearing in mind that the suppression of urine and rapid emaciation are manifestly the result of the withdrawal of a vast amount of fluid, and the consequent concentration of the toxins, the treatment recommended is a full and free supply of water through every possible channel. Daily stomach washings and rectal irrigations, so managed that a large amount of fluid is left in the gut, after the withdrawal of the tube, should be employed. The medical treatment in those cases is confined to the administration, by the stomach, of large doses of bismuth. In all cases milk is suspended, and the child fed on albumin water, or beef-juice diluted with barley water. We should never lose sight of the fact that opium in any form, mercury, coal-tar products used for the purpose of disinfecting the intestinal tract, such as salol or carbolic acid, are ruinous in these special cases, and only tend to deepen the toxæmia, and, by irritating the kidney, intensify the functional disturbance in that organ.—*Med. Rec.*, N. Y., 1st April 1899.

REPORTS OF THE MEDICAL SOCIETIES.

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Edinburgh Medico-Chirurgical Society, *7th June* 1899.—In the absence of the **President**, Dr. **William Craig** presided.—Mr. **Shaw M'Laren** showed a patient after disarticulation at the hip for injury.—Mr. **Cathcart** showed a patient after operation for perforated vermiform appendix with general peritonitis.—Mr. **Caird** showed a patient suffering from secondary syphilis, who had the typical facies of congenital syphilis.—Dr. **Shennan** showed—(1) Malignant pustule, (2) microscopic slide showing anthrax bacilli in a section of the pustule, (3) sarcoma of cerebrum, (4) calcareous deposit in the epididymis, (5) extensive infarcts of kidneys, (6) tuberculous nodule in the wall of the heart, (7) lungs showing diabetic phthisis.—Dr. **James** read a paper on "A Case of Congenital Syphilitic Osteitis." The patient, a man æt. 18 years, was one of a family of nine, of whom four died in infancy. There were three miscarriages, and although both parents denied having had syphilis, there is very little doubt that one or both had had syphilis. The patient suffered from interstitial keratitis when a child, and at the age of 9 from pain and swelling in the right tibia. This improved under the administration of potassium iodide, though the swelling on the tibia still remained. He again came under treatment for nodular swellings, and again improved. He returned last year complaining of weakness of the fingers, twitchings, vomiting, and occasional attacks of unconsciousness. The right tibia was found to be thicker and longer than the left. There was some impairment of vision from optic neuritis. The diagnosis was syphilitic osteitis and gumma of the brain. The patient died shortly after, and at a post-mortem examination a gumma was found in the brain. Microscopic examination of the thickened tibia shows a thin rim of dense bone and the rest of the node to consist of cancellated bone. The medullary cavity was occupied by this spongy bone, and there was a large quantity of fat and some marrow cells filling the interstices. It was to this appearance of the bone that Dr. James specially drew attention. He thought it was due to a reversion of the adult bone to a fœtal type, and that while it grew in size, this growth took place at the expense of development.

Edinburgh Obstetrical Society.—*Wednesday, 14th June* 1899.—The **President**, Dr. **Halliday Croom**, in the chair.—The **President** made a feeling reference to the loss the profession had sustained by the death of three of the Fellows of the Society—Dr. **John Moir**, Mr. **Lawson Tait**, and Dr. **Sinclair Coghill**.

Specimens were shown by The **President**, Professor **A. R. Simpson**, Dr. **Foulis**, Dr. **Keppie Paterson**, Dr. **Haultain**.

Communications.—The **President** read a paper on "Two Cases of Mistaken Sex." Two supposed girls, aged respectively 19 and 21, were brought to him by their mother, with the history that they were quite well but had never menstruated. Their voice was loud and harsh, and the figure was of the masculine type. On examination under chloroform, it was found that both were cases of hypospadias, the meatus urinarius being discovered at the base of what seemed simply a hypertrophied clitoris, while the supposed labia were simply the two parts of a scrotum, and each contained a small testicle. There was no trace of vagina, uterus, or appendages, but the prostate was easily felt per rectum. Dr. Croom discussed the legal and social difficulties of such cases, and referred to the literature of the subject.—Dr. **Jardine** read a paper on "The Treatment of Eclampsia by Saline Injections, with Notes of Twelve Cases." He found that saline injections had in most of the cases a marked rapid diuretic action and a speedy beneficial effect on the general condition of the patient. He considered the addition of bicarbonate of potash to the solution, of great importance, and he gave his reasons for this belief. It lowered the abnormally high blood pressure during eclampsia. Of the twelve cases recorded, four died, but these were all hopeless when first seen.

OBITUARY.

Lawson Tait, F.R.C.S.Ed. and Eng.

Although Mr. **Lawson Tait** was known to be in very indifferent health, his sudden death has come as a shock and surprise to all of us here who knew him so well. Though his name was made in Birmingham, and most of his work done there, Edinburgh can claim his birth and education. None of us can forget the short rotund figure, the massive head, the firm mouth, and thoughtful eyes. A man of universal interests and cosmopolitan reputation, his death robs the profession of a really brilliant surgeon.

He was a man of wide culture, and a mine of information on all subjects. A politician, a preacher, a curio-hunter, and archæologist—he was a prolific writer on all subjects which were of interest to humanity. His long letter to the *Times* last winter, concerning the present controversy in the Church of England, was amongst his latest contributions to general topics. He shone as a debater. He was blunt and brusque even to the verge of rudeness, and he was masterful and remorselessly tenacious in argument. There was no more interesting personality. In private he was a genial friend, a wonderful raconteur, possessed of an inexhaustible fund of humour.

He began his medical career in Edinburgh. He became House-Surgeon in Wakefield Hospital, and thereafter removed to Birmingham, where all his work was done. There he was one of the founders of the Women's Hospital, a project that encountered much opposition. From start to finish he had a most wonderful career. Professor of Gynæcology in Queen's College, Hastings Gold Medallist, Cullen and Liston Triennial Prizeman, he shed lustre on many honours and appointments freely and ungrudgingly bestowed upon him.

Beyond his great reputation at home, he enjoyed if possible a still greater in America. No one could visit him at his house at the Crescent, without meeting endless numbers of practitioners from the States and from the Colonies who had come to study with him.

In gynæcology he was the pioneer in tubal disease. He cleared up the whole question of tubal gestation, so far as surgical procedure is concerned, and his records are most remarkable. He developed the operation and limits of oöphorectomy. For long he told his results to unwilling ears, and although his followers have brought much of his work in the department into well-deserved ridicule, yet the basis of his work remains. He made the operation of oöphorectomy for fibroids his own, and his results have been excellent. It is needless to mention his work on the full bladder, his long contention about aseptic surgery, his introduction of purgatives instead of opium in the treatment of peritonitis, and his numerous improvements in the technique of abdominal surgery.

His pecular position with regard to vivisection can only be accounted for by his great love of animals. All his work, both literary and operative, is too well known to require recapitulation here. His was undoubtedly a great mind, and he has left his mark indelibly impressed on modern gynæcological surgery.

ROBERT MOIR, M.D., F.R.C.S.Ed.

DR. ROBERT MOIR, born at Musselburgh, 23rd October 1831, was educated at the Grammar School there and at the Edinburgh Academy. He graduated at Edinburgh University, 1852, with a thesis "On Diseases and Injuries of the Vertebræ." After acting as Resident Physician (under Dr. Halliday Douglas) and under Dr. Richard Mackenzie as Resident Surgeon in the Old Infirmary, he went to Paris and studied at various cliniques, and then to India in 1853, where he was appointed to the Hon. East India Company's Medical Service by Lord Dalhousie. After a few months in Calcutta he was sent to Dibrugarh in Assam, where he did both military and civil duty during the Mutiny. His health broke down, and he was sent home on sick furlough in 1858. He returned to India at the beginning of 1860, and was posted to Hauper in the North-West Provinces. He was Civil Surgeon afterwards at Naini Tal and at Benares, and then Medical Superintendent of the large central jail at Agra, and he served on a Jail Commission for Bengal. He was Civil Surgeon at Simla, and from there he went to Calcutta as Civil Surgeon of the Twenty-Four Parganas. He was officiat- for the professor of midwifery at the Calcutta Medical College at the time he came home in 1875 on furlough, and he retired from the Indian Medical Service in June 1877 as a Surgeon-Major. From 1875 he has practised continuously in St. Andrews, succeeding Dr. O. H. Bell, and he has been very closely connected with the Cottage Hospital there. By his death a striking and well-known figure has been removed.

JOHN GEORGE SINCLAIR COGHILL, M.D., F.R.C.P.Ed.

DR. SINCLAIR COGHILL, who has so long been associated with the National Hospital for Consumption at Ventnor, died there suddenly, from perforating gastric ulcer, on 5th June, shortly after his return from the Tuberculosis Congress in Berlin. A native of Caithness, where he was born in 1834, he was educated at the High School and University of

Edinburgh. His career at the latter was interrupted by a term of naval service during the Crimean War, but he returned to his studies and graduated in 1857.

After acting as Assistant to Sir James Simpson, and as Demonstrator under Professor Allen Thomson, he accepted important municipal and hospital posts in Shanghai, where he spent eight years. Returning to Edinburgh in 1869, he again acted in association with Sir James Simpson for a time, and afterwards lectured on Pathology, but in 1875 he became Physician to the Hospital at Ventnor, with which he was thereafter identified until his unexpected and regretted death.

Norman Kerr, M.D., F.L.S.

Born in Glasgow in 1834, Dr. Kerr was educated at the High School of his native city, and for some years devoted himself to journalism. Turning himself to the study of medicine, he took his degree in Glasgow in 1861. After filling several important posts, he settled in London in 1874 as one of the parochial medical officers.

Dr. Kerr's life-work was the advancement of temperance. He was not only one of the leading spirits in the various societies for the study and prevention of inebriety, but he threw himself into the subject with tireless energy, and advocated the cause by voice and pen in season and out of season. As is well known, the recent legislation for inebriates was largely due to him.

For some time he had been in failing health, and he died at Hastings on 30th May.

RECENT APPOINTMENTS.

The Curators of Patronage of the University of Edinburgh have elected Professor **Edward Albert Schäfer**, Jodrell Professor of Physiology in University College, London, as successor to the late Professor Rutherford. The new professor brings with him the fame of a distinguished career, and in welcoming him to Edinburgh we desire at the same time to offer him our congratulations on his accession to a wider sphere. It is gratifying to observe that even with the diminished emoluments now attached to the scientific chairs, they still continue to attract as candidates men of eminence from all parts of the world.

Dr. **Leith** has just been appointed Professor of Pathology in the Mason University College, Birmingham, and we are happy to think that the College has obtained the services of one who has proved himself to be an indefatigable and successful worker in the department of Pathology, and an excellent teacher. We are glad to know that he has now a position which will provide him with a suitable field in which he may exercise his gifts of organisation, instruction, and investigation.

ANALYTICAL REPORTS.

VITÆ ORE.

THE ore of life is, when interpreted, a natural mineral product procured in America, resolved into a fine powder by prolonged oxidation of the broken-up ore, through exposure to the air and sunlight. Treated in this manner, the original hard black mineral masses crumble down to a brownish powder, 25·77 per cent. of which is soluble in water. The insoluble matter is chiefly silicious; the soluble largely composed of ferric sulphate 13·67 per cent., and ferrous sulphate 3·04 per cent., or 16·71 per cent. in all. Of the remainder, 7·15 per cent. of the original total is in the form of water, in part the water of crystallisation; while 1·91 per cent. represents the amount of aluminium, magnesium, and sodium sulphates present. The oxidation of the ore transforms an insoluble sulphide of iron into soluble sulphates.

The powder resulting from this procedure practically supplies one with a substance from which a home-made ferruginous water can be manufactured.

In place of the slow operations of nature in the extraction of soluble mineral matters and in the formation of a mineral spring, the oxidised ore offers the material, only requiring the addition of water, to serve as a source of a ferruginous tonic water. And the manner of its use is as follows:—An ounce of the powder is to be put into a quart bottle, the bottle filled up with cold water, distilled or sterilised, the bottle shaken, allowed to stand until the insoluble precipitate has completely fallen to the bottom, the clear supernatant liquid decanted, and a teaspoonful of this taken thrice daily in warm water. The designation of the measure for the water used, a quart bottle, renders it uncertain if an imperial quart of 40 oz. or a reputed quart of 26 oz. is intended. In an ounce of the powder there are 73·1 grs. of the iron sulphates, so that, if the quart be 40 oz., each teaspoonful of the clear fluid will contain about ¼ gr.; if 26 oz., about ⅓ gr. of these salts. Even if the dose be increased to a tablespoonful thrice daily, as is said may be done by some, each dose will only represent about 1 gr. or 1⅓ gr. respectively.

It is to be trusted that the ore will be reduced in price before long; at present each grain of iron sulphate costs three farthings, the 73·1 grs. in an ounce costing 4s. 6d. However that may be, the iron salts appear to be absorbed easily, to produce no constipating effect, and the combination as a whole to occasion far more marked results than its composition might suggest.

HORLICK'S MALTED MILK.

(Horlick's Food Co., Farringdon Road, London.)

IF there is any one artificial food preparation in the form of a dry, fine powder which merits high praise, it may be safely stated to be Horlick's Malted Milk. It is composed of wheat and barley malt, and fresh pasteurised cow's milk, dried *in vacuo*. It consequently contains soluble dextrins and maltose, and casein so altered under the influence of the malt fermentation products as to have lost its native property of adhering together in the form of curds, when it comes in contact with the acid and rennet of the stomach secretion.

In all the cases in which we have had occasion to order this preparation we have found it answer admirably; easily taken, perfectly tolerated, and quickly productive of beneficial effects. It requires no cooking, nor any further preparation than the addition of some water. In children, whatever their age may have been, it has frequently proved of vital service in our hands, in whom either former improper feeding, weak powers of digestion, or some idiosyncrasy which prevented ordinary foods from agreeing, or from being sufficiently made use of, had caused dietetic difficulties.

THE CROWN MEAT AND MALT WINE.

(Lamb & Watt, Liverpool.)

THE Crown Meat and Malt Wine is a very palatable combination. It smacks less of the medicinal class of wine than any of the others we have met with. A fine ruby-red colour, it is perfectly clear, fresh, and liquid. Investigation shows it to be of a slightly acid reaction, with a specific gravity of 1023, and to contain proteid derivatives in very considerable amount. Grape-sugar and dextrins are present, while we would estimate the alcoholic strength to be about 19 per cent., compared with the 22 per cent. commonly met with in port wine. As the specific gravity of port wine is usually about 0·988, the figure given by this preparation proves that it contains a large quantity of added solids, as its name implies. In fact it consists of a sound wine, strengthened by the addition of nutritious substances, and should prove to be of service where stimulation, by the addition of easily absorbable nutritive foodstuffs and of alcohol to the ordinary diet, is advisable. It must only be the more particular connoisseurs of port wine who can object to such a therapeutical preparation.

NEW PATENT POISON BOTTLE.

(Hearns Limited, Clapton, London.)

A POISON bottle of a new and patented shape has been submitted to us. In view of the more stringent legislation recently adopted with regard to the dispensing of poisons, this novelty is suggestive. The mouth, neck, and shoulders of the patent bottle, of dark blue glass, are of the usual shape; but from the shoulders the sides slope in as if laced into a corset, to a waist rather above the centre, again widening down to about an inch above the foot, when it becomes similar in breadth to the shoulders. The front and back surfaces are flat, and bear letters, raised from the glass, forming the word "poison." Whatever object may have suggested the shape of the bottle—it is uncommonly like a milliner's model for the fitting of bodices—there is no doubt that anyone picking it up would require to be very confused or absolutely insane to mistake it for an ordinary bottle holding an innocuous mixture or something to drink.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Four Weeks ending May 27, 1899; and for the Year from January 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	47°·9	*[1] 197° [2] 441°	27° 646°	1·9	11.1	155	489	2°·7
Observed	43°·9	[1] 129° [2] 381°	63° 669°	3·3	14·9	134	499	2°·0
Difference	−4°·0	[1] −68° [2] −60°	+36° +23°	+1·4	+3·8	−21	+10	−0°·7

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland (Edinburgh, Dundee, Aberdeen, and Leith), during May, and since January 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1]1,104 [2]5,942	193·5 207·9	244 1117	42·7 39·0	106 571	18·6 19·9	196 1281	34·4 44·8	128 653	22·5 22·8
Actual Deaths and Rate per 10,000	[1]1,065 [2]6,002	186·4 210·0	246 1188	43·0 41·5	104 545	18·3 19·0	147 1182	25·6 41·3	159 677	27·8 23·6
Difference from Mean	[1]− 39 [2]+ 60	−7·1 +2·1	+ 2 +71	+0·3 +2·5	− 2 −26	−0·3 −0·9	−49 −99	−8·8 −3·5	+31 +24	+5·3 +0·8

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 64 [2] 333	11·27 11·6	28 144	4·94 5·0	81 468	14·2 16·3	120 567	21·67 19·8	52 237	9·2 8·3
Actual Deaths and Rate per 10,000	[1] 56 [2] 347	9·8 12·1	21 141	3·7 4·9	77 528	13·6 18·4	106 579	18·5 20·2	68 283	11·8 9·7
Difference from Mean	[1] − 8 [2] +14	−1·47 +0·5	−7 −3	−1·24 −0·1	− 4 +60	−0·6 +2·1	−14 +12	−2·57 +0·4	+16 +46	+2·6 +1·6

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* Note.—The figures [1] denotes the data for May, [2] for year to date.

The meteorological elements for the first four weeks of May were of a most abnormal kind: a mean temperature 4° below the average, a rainfall equal to 173 per cent. of the mean, a deficiency of sunshine equal to 13 per cent. of the normal amount, of day-degrees above 42° F. 34 per cent. of those expected, of those below 42° F. 129 per cent. when compared with the same, and an extraordinarily contracted range of mean variability from day to day. This limited variability has seldom been equalled, never excelled, when the entire month is taken into account; the first week of the period this year afforded as small a figure as 1°·3 for this value. The type of weather was largely dominated by peculiarly complex but shallow depressions over our islands or the Continent, or by secondary disturbances, leading to wind currents from the polar regions or from the east.

The figures for the year to date have altered very markedly since last noted. The slight accumulation of warmth as represented in day-degrees over 42° F., and the defect of cold in degrees below that temperature, have become *per contra* a noticeable defect and a moderate excess; the excess of rainfall has risen from 26 per cent. to 34 per cent. of the total expected, while the credit sunshine balance has dropped from 10 per cent. to 2 per cent. of the average.

In spite of the cold weather of May, the total number of deaths fell considerably (3·5 per cent.) below the average, the defect being especially marked under the respiratory system. In this connection it is interesting to note that the daily mean variability of temperature was very low, a point which has been already pointed out in this column on former occasions. That a month with such inclement meteorological accompaniments should yield a lower mortality than that usually resulting from respiratory diseases, from pneumonia and phthisis, points to the probable greater influence of variations in the air temperature from day to day, be the absolute mean temperature high or low, compared with more steady thermometric conditions, be they ever so cold, unseasonable, and wet, upon pulmonary diseases. Nervous diseases caused an excess in number of deaths due to them, equal to 24 per cent. of the usual total; cancer similarly as much as 40 per cent.

The figures for the year to date show an increase in total mortality equal to 1·2 per cent. of the average, in deaths from constitutional diseases equal to 6·7 per cent., pneumonia 13 per cent., and from cancer 21·9 per cent.; decreases of 7·7 per cent. under respiratory, and 4·5 per cent. under circulatory diseases.

Influenza was returned as the cause of fourteen deaths during May.

May, therefore, cold, wet, rich in east and north-east winds, but with an unusually slight variability of temperature from day to day, returns a lessened mortality, especially from respiratory diseases, but an increased number of deaths from cancer and from nervous diseases (for which latter the spring epidemic of influenza may be responsible).

The year to date, wet, cold, but not sunless, is chiefly remarkable for deficiency of deaths from lung diseases and for increase of those due to pneumonia and cancer.

EDINBURGH MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

OBSERVATIONS ON A CASE OF INTERMITTENT FEVER.

By J. O. Affleck, M.D., *Physician to the Royal Infirmary, Edinburgh;* with an Account of the Examination of the Blood, by D. A. Welsh, M.A., M.D., *Pathologist to the Royal Infirmary, Edinburgh.*

While it is not uncommon for us, in the Royal Infirmary, to meet with patients suffering from some of the sequelæ of malarial poisoning, it must be admitted that we do not often encounter cases of the more acute manifestations of that condition, such as attacks of intermittent fever. One reason of this is the fact that most of those who may previously have had such attacks have already undergone treatment, or else that they possess their remedy, quinine, and apply it whenever any acute symptoms threaten. Every now and then, however, a case of ague comes under our notice, and while at all times a matter of clinical interest, it has recently become a subject of special importance, from the fact that it affords the opportunity for the detection of the characteristic parasite in the blood.

The following case, although possessing few outstanding features of clinical importance beyond those characterising an ordinary tertian ague, derives a special interest from the fact that the malarial organism was distinctly and readily detected.

Case 1.—W. S., æt. 24, formerly a soldier, was admitted into Ward 29 of the Edinburgh Royal Infirmary on 17th October 1898, complaining of "fever and ague," which had been going on for about three weeks. He gives the following history:—

About two years ago (in October 1896), when quartered with his regiment at Mandalay, in Burmah, he had an attack of fever. This attack was slight, lasting only a few hours, and he did not require to lay up with it, although he got medicine for it. A second attack of a similar character occurred shortly after. Fever was very prevalent in the regiment at the time, but these two slight attacks were all he suffered from. Later, he began to show symptoms of tubercular glands in the neck, and was treated in hospital for a long time, the glands having to be scraped. He was invalided home owing to this in December 1897, and on the voyage he suffered from another attack of fever similar to those he had had in Burmah, but much more severe; and shortly after arriving home, in March 1898, he had a further attack in Edinburgh. During all the summer he kept well, until the end of September 1898, when the attacks of fever for which he has come to the Infirmary began. They first show themselves by a rigor lasting nearly half an hour, followed by great heat, which continues for several hours, and ends in copious sweating. These attacks occur about once in two days, and he has consequently had some ten of them since they began in the end of September. In the intervals between the attacks he feels well, although rather weak.

The patient is thin and sallow, and shows two large cicatrices on the left side of his neck. Beyond a slight increase of the splenic dulness no abnormal physical signs can be made out. On examination of the blood, the hæmoglobin is 70 per cent.; the red corpuscles, 4,400,000; the white cells, 8200.

A diagnosis of malarial fever was made, but no treatment was resorted to at first, so that there might be an opportunity of witnessing a paroxysm and verifying its true character. This opportunity occurred on the night of his admission. About 1 A.M. of Tuesday, 18th October, he complained of a feeling of discomfort in the left hypochondrium, and this was soon followed by a rigor of moderate severity, lasting off and on for about half an hour. There was no rise of temperature at first, but at 1.40, when he began to shiver severely, the thermometer stood at 100° F. The pulse was 100, and the respiration 18. At 2.10 the temperature was 102°·2, the shivering still continuing, although becoming less. The patient now complained of headache, and began to feel very hot and restless. At 2.30 the temperature was 103°·6, and at 3.5 the maximum of 105° was attained. Shortly after this, perspiration began, and became profuse, the temperature steadily falling during its continuance. At 7 A.M. it had reached 100°, but then it began slowly to rise again until 11 A.M., when it had got up to 102°, after which there was a rapid fall to normal (see chart). Beyond feeling somewhat languid, he kept well during the remainder of Tuesday the 18th, and also during the whole of Wednesday the 19th, until 11.30 P.M. on that day, when a second attack began. It was almost exactly similar to the former, excepting that the temperature came down from its maximum point, 105°·2, more swiftly, and did not rise again that day. During this paroxysm a large number of blood films were taken by Dr. Welsh, and the presence of the malarial organism was demonstrated.[1]

A third paroxysm occurred on the night of Friday, 21st October, about nine o'clock, which proved to be more severe than either of the two preceding. The cold stage was more prolonged, and during its continuance the temperature rose somewhat slowly. At 11 P.M. the thermometer stood at 104°, and now the patient began to feel extremely hot. At 11.45 the temperature had risen to 108°, when perspiration began, and flowed profusely. This was followed by a rapid descent of the temperature, so that at 11.50 it had subsided to 104°·2, and at 12.15 to 101°·8. At 12.30 it rose again to 103°·2, and then gradually fell during the night, attaining the normal point at 6 A.M. on the 22nd October.

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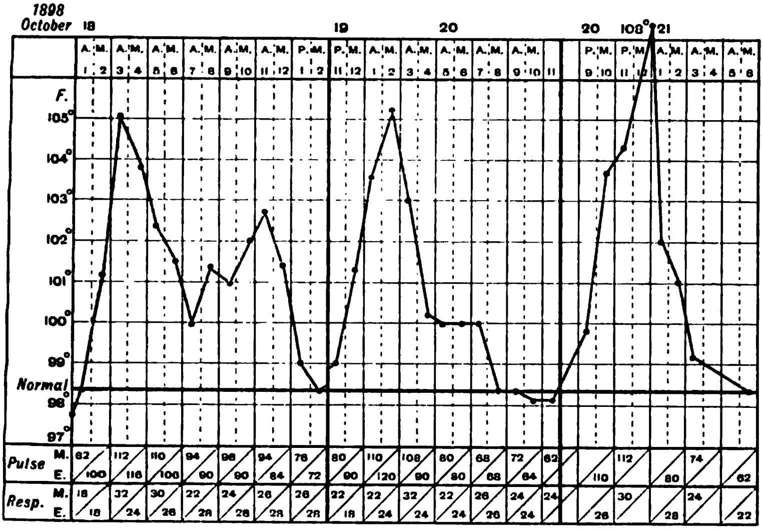
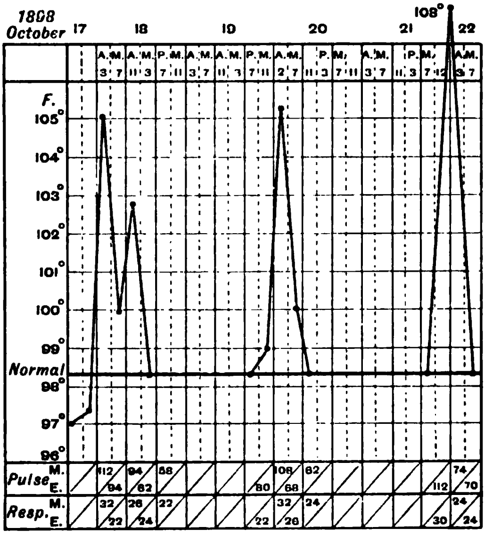
[1] Films were taken from this time until the termination of the case at frequent intervals, as mentioned in the account of the examination of the blood.





The patient felt more prostrate after this attack, and slept heavily during a considerable part of the day. Quinine was now given in 4-gr. doses every three hours, with an additional dose of 10 grs. on the evening of the 23rd, and no further attack occurred. The patient remained in the Infirmary until 3rd November, when he left to return home, feeling quite well.

Two points of clinical interest are worthy of note in this case:—

1. The attacks of fever which the patient suffered from in Burmah, where he acquired the disease, were exceedingly slight; and it was not until he had left that country and had come into colder latitudes that the typical paroxysms of intermittent fever occurred. In the comparatively few cases of ague we have had an opportunity of observing, this has been noticed more than once. It would seem to point to the effect upon the patient of a change of temperature, as one of the accessory causes of an active development of the malarial organism in a patient who has already acquired the disease.

2. The rapid response to quinine, administered in comparatively small doses, and the speedy disappearance of the parasite from the blood.

Since leaving the Infirmary the patient has returned several times to report himself. He states that there have been no further attacks, but that he sometimes resorts to a little quinine, simply as a precaution.

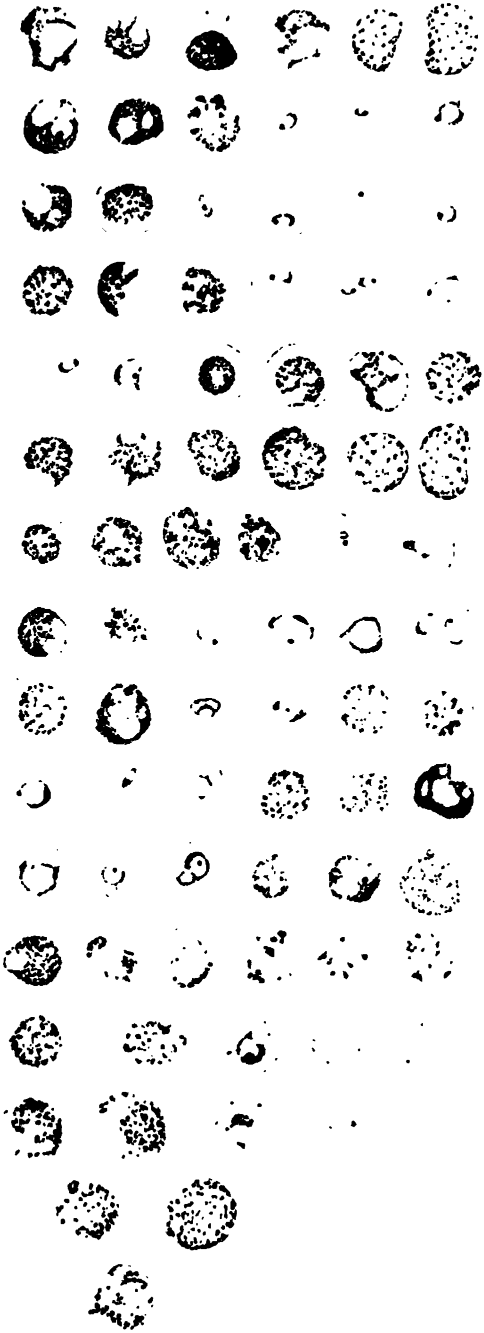
EXAMINATION OF THE BLOOD.—*Preparation, fixation, and staining of the films.*—The cover-glasses employed were thoroughly cleansed by Van Ermengem's method, which consists in placing them for twenty-four hours in a mixture of concentrated sulphuric acid 6 parts, potassium bichromate 6 parts, water 100 parts, then washing thoroughly in water and keeping in absolute alcohol. The delicate skin on the dorsum of the terminal phalanx of the thumb was cleansed with alcohol, and allowed to dry; then, after tying a handkerchief round the first phalanx, till the skin became congested, a puncture was made with von Graefe's knife, so that a drop of blood exuded. With a small loop at the end of a platinum needle, a minute droplet of blood was transferred to the centre of a cover-glass held in the left hand. A second cover-glass was rapidly applied, so that about three-fourths overlapped the other, and the blood became spread out in a thin film between them. The cover-glasses were then rapidly separated, allowed to stand while wet for a few seconds, until the red corpuscles should resume their normal shape, and finally dried by waving them in the air.

The subsequent fixation of the films prepared in this way was effected by the following solution:—

Tannic acid, watery solution, 20 per cent.	2 parts.
Mercuric chloride, saturated watery solution	2 ,,
Potash alum, saturated watery solution	5 ,,

A few drops of this solution were filtered on to the dried films, allowed to stand for two or three minutes, washed thoroughly in water, then in methylated spirit, then in water again, in order to remove all traces of the fixing solution. This method of fixation, and the use of a small loop on a platinum needle in preparing the

No.	Date.	Hour.	Temperature.
2	Oct. 19	2.0 P.M.	N.
3	,, 19	11.45 ,,	100°·4
4	,, 20	12.45 A.M.	103°·6
5	,, 20	1.45 ,,	105°·2
6	,, 21	1.30 P.M.	N.
7	,, 21	4.30 ,,	N.
8	,, 21	9.10 ,,	99°·8
9	,, 21	10.10 ,,	103°·6
10	,, 21	11.30 ,,	104°·6
11	,, 22	1.0 A.M.	102°
12	,, 22	Noon	N.
13	,, 22	8.15 P.M.	N.
14	,, 23	10.30 A.M.	N.
15	,, 23	8.0 P.M.	N.
16	,, 24	10.30 A.M.	N.
17	,, 24	8.45 P.M.	N.



films, were recommended by Mr. Richard Muir, and have the great advantage of giving striking and uniformly good results.

The films were next stained for two to four minutes in a 1 per cent. solution of thionin blue in a 2½ per cent. solution of carbolic acid in water, then washed thoroughly in water, dehydrated in absolute alcohol, cleared in xylol, and mounted in balsam. In this way the red cells stain a light bluish green colour, the nuclei of leucocytes and the protoplasm of the malarial parasites take on a deep violet hue, and thus stand out prominently. It is far better not to make use of any contrast stain (*e.g.* eosin), as the young non-pigmented parasites are thereby obscured, and the structural details of all forms rendered less apparent.

Varieties of the parasite found in the peripheral blood.—1. *Early, unpigmented, amœboid, epi- or intra-corpuscular forms.*—The earliest forms discernible in the peripheral blood were small ring-like masses of protoplasm, entirely devoid of pigment, lying upon or within the red cells. On more careful examination each could be resolved into a minute, rounded nodule, placed eccentrically on the rim of a larger clear central vesicle, around which a small amount of cell protoplasm was distributed. The central vesicle was relatively large, most frequently ovoid in outline, and invariably clear, translucent, and unstained. It was surrounded by a narrow, sharply defined rim of protoplasm, which stained a deep violet colour with thionin blue. The minute rounded nodule was placed at one pole of the ovoid vesicle, and appeared to be either continuous with, or closely applied to, the protoplasmic ring. It was constantly present, always stood out prominently, and was also deeply stained by thionin blue. A variable but scanty amount of cell protoplasm was distributed in small irregular masses around the central vesicle. In most instances it appeared to develop at the pole opposite the minute nodule already described, but sometimes it seemed to be formed around the nodule itself. In these early forms no trace of pigment was discoverable. It not infrequently happened that various modifications were found in the minute structure of these young parasites. Thus there were sometimes more than one nodule in the rim of one vesicle; or there were two vesicles, the outline of which formed a figure-of-eight, with a nodule at the intersections. Sometimes two distinct and separate young parasites were present in the same red cell, and many other peculiarities were observed, some of which are represented in the accompanying scheme.

The rate of growth of the young parasites was fairly rapid. In an hour or two the central vesicle was distinctly larger, the darkly stained nodule still more evident, the peripheral protoplasm notably increased, and irregularly projected by its active amœboid movement into the substance of the red cell.

2. *Large, pigmented, amœboid, intra-corpuscular forms.*—While the eccentric nodule and central vesicle were still distinctly present, there began to appear in the peripheral protoplasm exceedingly fine scattered granules of a yellowish brown pigment, derived from the disintegration of the red cells. Very soon after the pigment became noticeable, however, marked changes began to occur in the structure of the growing protozoa, associated with their increase in size. The minute, darkly stained nodule, which was so characteristic a feature of the earlier stage, became merged in the adjacent cytoplasm, and quite indistinguishable from it. The vesicle enlarged, often to a considerable extent, and very frequently appeared reduplicated, to form two or three clear vesicles with sharply defined margins. The cell protoplasm was greatly increased in amount, so that its bulk approximated to that of a normal red cell. The development of the protoplasm still appeared to take place unequally round the vesicle or vesicles, which thus in turn came to occupy an eccentric position in the general protoplasmic mass. Along with this increase in size the amœboid activity was lessened, so that the numerous long protoplasmic processes were no longer seen, only a few shorter, blunter pseudopodia. The accumulation of pigment was greatly increased, as the destruction of the red cell advanced, and numerous fine granules of a yellowish brown colour were scattered throughout the protoplasm, but not in the vesicular bodies.

3. *Pigmented, non-amœboid intra- or extra-corpuscular forms.*—As the cycle advanced, the parasites lost their amœboid activity and assumed a regular outline. Their shape was chiefly ovoid, sometimes reniform, and, in still older forms, more nearly spherical. In size they showed a great increase, and their long axis usually exceeded that of a normal hæmocyte. The vesicular bodies entirely disappeared, so that the structure appeared more uniform. The protoplasm sometimes stained equally throughout, sometimes a more deeply stained reticulum could be distinguished, giving the parasite an irregularly ribbed or barred appearance, with granules of pigment in the interstices. The pigment was much more abundant, and formed larger masses, sometimes occurring as coarse granules, but more commonly as short thick rods. As in the earlier varieties, the pigment masses had a distinctly yellowish brown colour; in no instance was there any trace of the black pigment, stated by Manson to be so characteristic of most forms of malaria. Although undoubtedly a derivative of the hæmoglobin of the red cells, the pigment did not yield the iron reaction on being treated with hydrochloric acid and ferrocyanide of potassium in the ordinary way, and other methods were not tried. The great majority of these parasites were still contained within the remains of the red cells, which were greatly enlarged and often extremely decolorised; but a few, and these especially the more nearly spherical forms, showed no vestige

of a red cell around them, and appeared to lie free in the blood plasma.

4. *Sporulating bodies and free spores.*—Towards the end of the cycle a further change was noted, but only in a very few cases. The parasite either within or without the red cell became rounded, the pigment tended to accumulate in the centre, or became arranged in radiating lines. The protoplasm showed indications of segmentation, often irregularly, so that the parasites appeared to be composed of a number of segments with no very definite arrangement. In a few instances the segments were disposed in a more or less radial manner, and a rosette-shaped body was formed, with a dense, dark mass of pigment at the centre.

The final stage was represented by a number of free spores which had been liberated by the rupture of the sporulating bodies. They were minute, rounded masses of protoplasm, somewhat smaller than the blood plates, but distinguished by their rounded outline and vesicular appearance. In the centre of each spore there may be found an exceedingly small, darkly stained nodule, which is not a particle of pigment, but a condensation of protoplasm, and which, when the spore becomes affixed to a red cell, and the young parasite begins to develop within it, moves into the eccentric position, on the rim of the vesicle already described.

Relation of the various forms of the parasite to the periodicity of the fever.—In the majority of cases of mild tertian ague, the onset of the attacks of pyrexia occurs at regular intervals of forty-eight hours, but in some cases the interval between successive attacks is either longer or shorter by an hour or two. Such fevers are said to "postpone" or to "anticipate." Now the case under consideration was a very characteristic example of the "anticipating" type, and the interval between the successive attacks was abbreviated by almost exactly two hours. In other words, the life cycle of the protozoon in the blood was completed in forty-six hours. Manson directs attention to the remarkable fact that the majority of intra-corporeal forms should mature almost simultaneously, and so produce a corresponding liberation of fresh broods of young parasites in the circulating blood. The maturation of the older forms and the appearance of the new generations correspond with the onset of the rigor, and continue throughout the rise of temperature; and Manson suggests that the exciting cause of the fever is the liberation of toxins, by the breaking up of the sporulating bodies to form free spores. A few parasites do not reach maturity until late in the fever or even after the pyrexia has subsided, but such belated development does not affect the usual course, unless a considerable proportion of the parasites should be implicated, when a remittent fever is produced.

The relation of the various forms observed in the present case to the different stages of the fever is most conveniently described and summarised by reference to the accompanying tabulated series of drawings, which were very admirably executed for us by Mr. Richard Muir. The scheme requires no explanation, apart from the statement that the parasites selected for drawing were typical examples from a number of films taken at each of the periods indicated, and that, although the relative numbers in each series are roughly accurate, no attempt was made to determine the exact proportion of young to old forms.

The blood was examined during two successive febrile attacks, and during the interval between, and some further observations were made on the effect on the malarial protozoa of the administration of quinine. Series 2 to 6 show examples of parasites found during the first attack, Series 7 to 12 include types found during the second, while those from 13 to 17 illustrate some of the effects of quinine.

It will be observed that the varieties found in the peripheral blood were typical examples of the mild tertian form of parasite. The characteristic ring-like forms of the young amœbæ began to appear on or within the red cells as the temperature began to rise. Then, as the fever advanced, fresh broods were thrown off, and those already present continued to increase in size; hence during the pyrexia there was a great increase in the total number of parasites and a great preponderance of the younger forms (cf. Series 3, 4, 5, and 8, 9, 10, 11). Sometimes a few young parasites appeared in the apyretic interval (cf. Series 6), but, as a rule, their development was remarkably simultaneous and related to the inception of the fever. The arrested development of fresh generations appeared to coincide with the subsidence of the pyrexia; but the young parasites already liberated continued to develop, showed rapid increase in size, became more and more pigmented, and gradually lost their amœboid activity as above described (cf. Series 6 and 12). Complete maturation did not occur until just before or during the rigor, and the segmented forms were very scanty in the peripheral blood—a characteristic feature of the mild tertian parasite (cf. Series 3, 8, 9).

A small but distinct proportion of the parasites in the blood at any stage consisted of the large, pigmented, non-amœboid intra- or extra-corpuscular bodies. This was a striking and constant phenomenon at every period examined, and in all probability many of these bodies were a resting stage of the protozoon, or at least a stage at which further development had become either temporarily or permanently arrested. It will be shown later that it is in this form that the parasite appears to have the greatest capacity for resisting the action of quinine.

Changes in the hæmocytes.—When the protozoon first affixed itself to the red cell, no well-marked change was observed, but in a few instances the presence of the minute, ring-like bodies was associated with a slight relative increase in size of the red cell, and with a slight alteration in its staining reaction, so that it of a red cell around them, and appeared to lie free in the blood plasma.

4. *Sporulating bodies and free spores.*—Towards the end of the cycle a further change was noted, but only in a very few cases. The parasite either within or without the red cell became rounded, the pigment tended to accumulate in the centre, or became arranged in radiating lines. The protoplasm showed indications of segmentation, often irregularly, so that the parasites appeared to be composed of a number of segments with no very definite arrangement. In a few instances the segments were disposed in a more or less radial manner, and a rosette-shaped body was formed, with a dense, dark mass of pigment at the centre.

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As the parasite developed and acquired more and more pigment, the cell containing it became enormously increased in size, until, in many cases, its diameter appeared to be half as long again, or even twice as long as that of a normal cell. Probably the real size of the cell was somewhat exaggerated by the method of preparing the films, for although an undoubtedly great enlargement occurs, it may be that the red cell also becomes unduly soft and flabby, and thus more easily flattened out. This marked enlargement of the red cells affected is said by Manson to be another characteristic feature of the blood in the mild tertian forms.

Along with the enlargement a progressive and often extreme decolorisation of the hæmocyte occurs, the hæmoglobin being absorbed by the growing parasite, and transformed to pigment particles in its substance. Ultimately the pallor may reach such a degree that only the faint outline of the enlarged cell can be distinguished around the parasite. Finally, in many cases, the red cell ruptures, entirely disappears, and the parasite becomes free in the blood plasma.

Changes in the leucocytes.—No attempt was made to determine the total number of the leucocytes, or the exact proportion of the various forms; but it was noticeable that, while the total number was somewhat diminished, the large mononuclear variety was both absolutely and relatively increased—a fact previously established by Billings as occurring in this type of malaria.

It was further observed that only a very few leucocytes showed any pigment granules in their protoplasm. Often a whole series of slides would be examined, and the leucocytes found quite free from any trace.

Effect on the malarial parasite of the administration of quinine.—The changes produced by quinine were very pronounced, and may thus be summarised:—(1) Great alteration in structure, chiefly in the younger parasites. (2) Progressive diminution in numbers. (3) Ultimate disappearance of all forms from the circulating blood.

Quinine was first administered at noon on the 22nd October, and thereafter continued in 4-gr. doses of the sulphate every three hours, increased to 10 grs. at 9 P.M. on the 23rd, in anticipation of the next febrile attack, which, however, did not occur. Subsequent smaller doses were repeated until the patient was dismissed, and there was no recurrence of the pyrexia.

In estimating the effect on the parasites, it is to be noted that the quinine was first given about twelve hours from the height of the fever, at a time when the blood was swarming with young, growing parasites (cf. Series 12), and that the next observation was taken about eight hours later, when the full effect of three doses of 4 grs. each would be shown. At this time (cf. Series 13) there was no noticeable diminution in number, but the great majority of the parasites present showed a very profound alteration in their structure. The central vesicle and eccentric nodule were quite unrecognisable. The cell protoplasm became divided up into small masses, united by irregular delicate processes, or became bunched up in the centre of the red cell, throwing out several long filaments, like a miniature flagellated body. Sometimes the whole parasite was transferred into a series of long whip-like processes, or a cluster of pear-shaped bodies, or a number of irregular streaks of protoplasm. It was evident that the forms so remarkably altered in structure were the younger growing parasites, as the pigment particles, which were scattered among the subdivisions of the protoplasm, were small and fine, and not so abundant as in older forms. A few large, round, much pigmented older bodies were found, but they had undergone very little change. When twenty-two hours had elapsed since the first dose of quinine (cf. Series 14), a great diminution in the total number of parasites in the circulating blood was observed. Of those still present, a few of the older forms, to which reference has already been made, showed almost no structural alteration, but the majority had undergone still more advanced destructive changes. Their protoplasm became not merely fragmented and interrupted, but now stained more lightly and diffusely, and was dissipated and apparently partly absorbed by the red cell itself. In many cases only ghost-like forms of the degenerating parasites could be detected, even the pigment appeared to undergo a re-transformation, and to be gradually re-absorbed into the substance of the red cell.

In Series 15, taken about thirty-two hours after the first dose of quinine, and just when the fresh generations should begin to appear, there was a still more extreme diminution in the total number present, which included as before a few pigmented older forms, very slightly altered, and some others in the last stages of degeneration, as already described. There was not the slightest evidence of any attempt to reproduce fresh broods of young amœbæ.

After this time the diminution in numbers continued until only about two parasites could be found in any one film. The last series in which any organisms could be detected was taken about fifty-seven hours after the first administration of quinine, and the first absolutely negative result was obtained in films taken seventy hours after. Although films were taken twice daily, and carefully examined for a week later, no more parasites could be found in the peripheral blood, from which, therefore, they had disappeared in sixty or seventy hours after the first dose of quinine.

It was a very noticeable feature that, in the last two films where any protozoa were present, only the large, round, pigmented bodies were found, and that they continued to the very end to show exceedingly little change in structure (cf. Series 16 and 17). Apparently the younger forms are all disintegrated and disappear at a comparatively early date; while some of the older forms, which have attained a certain stage, but have not further matured, have a far greater power of resisting the action of quinine.

I desire, in conclusion, to express my thanks to Dr. Affleck for the opportunities he afforded me of examining the case, and to his resident physician, Dr. D. W. Maclagan, for much assistance in preparing the films.

DR. JOHN MAYOW: THE HARVEIAN ORATION FOR 1899.

By A. Crum Brown, M.D., D.Sc., F.R.S., *Professor of Chemistry, University of Edinburgh.*

"John Mayow, descended from a genteel family of his name, living at Bree, in Cornwall, was born in the parish of St. Dunstan's in the West, in Fleet Street, London, admitted a scholar of Wadham coll. on the 27th September 1661, aged 16 years, chose probationary-fellow of All-s coll. soon after, upon the recommendation of Hen. Coventry, esq., one of the Secretaries of State, where tho' he had a legist's place, and took the degrees of Civil Law, yet he studied physic, and became noted for his practice therein, especially in the summer time, in the city of Bath, but better known by these books, which show the pregnancy of his parts:

"'De Respiratione,' Tract. I., 1668; 'De Rachitide,' Tract. I., Oxon., 1669.

"'Of both which tracts is a large account given in the *Phil. Trans.*, No. 41, p. 803, anno 1668.

"'De Sal nitro et spiritu nitro aërio'
"'De Respiratione fœtus in Utero et Ovo'
"'De motu musculari et spiritibus animalibus'
} Ox. 1674, a large oct.

"Of these three last (which were printed again with the two first) is a large account given in the *Phil. Trans.*, No. 105, p. 101, etc., and all five were printed together at the Hague, 1681,[1] oct. He paid his last debt to nature in an apothecary's house, bearing the sign of the Anchor, in York Street, near Covent Garden, within the liberty of Westminster (having been married a little before, not altogether to his content), in the month of September 1679, and was buried in the Church of St. Paul, Covent Garden."

This short account from Wood's "Athenæ Oxonienses," 1722, is all I have been able to find as to the personal history of Mayow, except that on the 30th of November 1678, he was elected a Fellow of the Royal Society of London, having been proposed by Hooke.

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[1] And again in "Biblioth. Anat.," per Le Clerc et Mangetum, Genev., 1685.

He was thus twenty-three years old when he published his tract on respiration, and died at the early age of thirty-six.

I have chosen Dr. John Mayow as the subject of this discourse, not so much because he was a contemporary of Harvey—he was twelve years old when Harvey died—or because he also lived in Oxford and was a physician, as on account of the five tracts which form his "Opera omnia."

Mayow's works were not much noticed in his own time, and speedily fell into total oblivion.

When oxygen was discovered, about 1774, and when Lavoisier soon after expelled the phantom *Phlogiston*, which for a long time had haunted chemistry, Mayow's book was discovered in old libraries, where it had remained untouched for a hundred years; and those who discovered it were astonished to see that the new chemistry, which was rapidly conquering the scientific world, was to be found in this old book. As far as I know, Dr. Thomas Beddoes was the first distinctly to recognise Mayow's claim. It is interesting to note that not only did Dr. Beddoes discover this Cornishman, who had been dead and forgotten for more than a hundred years, but that he had the good fortune to discover a living Cornishman, a chemist of greater eminence than Mayow, for Humphry Davy was the superintendent of Dr. Beddoes' Medical Pneumatic Institution. Dr. Beddoes published his discovery of Mayow in a letter to Dr. Edmund Goodwyn, with an "Analysis of Mayow's Chemical Opinions." It is dated Oxford, 12th February 1790, two years before his resignation of the readership in chemistry. Besides Beddoes we have Dr. J. B. A. Scherer, physician in Vienna, who in 1793 published "Beweis, dass J. Mayow vor 100 Jahren den Grund zur antiphlogistischen Chemie und Physiologie gelegt hat.," and also G. D. Yeats, M.B. of Hertford College, Oxford, member of the Royal Medical Society of Edinburgh, and physician at Bedford, who in 1798 published "Observations on the Claims of the Moderns to some Discoveries in Chemistry and Physiology."

Beddoes quotes from Blumenbach's "Institutiones Physiologicæ," 1787, the following remarkable passage: "Magna jam pars memorabilium horum phænomenorum," says he, speaking of respiration, "quibus nuperis lustris et physica de aeribus factitiis disciplina et physiologia negotii respirationis tam egregie ditata et illustrata est, jam ante centum et quod excurrit annos innotuit acutissimi ingenii medico Joanni Mayow, cujus de *sal-nitro et spiritu nitro aereo* (quo nempe nomine dephlogisticatum aerem insignivit) tractatum, Oxon. 8vo editum, magna cum voluptate legi et relegi."

But these attempts to make Mayow and his work known to the scientific and medical world were not crowned with success, and without going further we can see one reason for this in the character of these attempts themselves.

Dr. Yeats had not been able to find in Mayow an interesting experiment, quoted by Dr. Beddoes, and wrote to him to that effect. Dr. Beddoes was very much distressed and alarmed, and writes:

"I have been long sensible that my abstract of Mayow was drawn up with more ardour than judgment. I should have referred, for example, to his tracts, page by page. But I had no conception that I could attribute to him an experiment which he never made, and one so remarkable in its plan and result. Perhaps your researches may enable you to explain the mystery. If there be not in Mayow any passage which I could have mistranslated, have you met with no author, whom I might have had upon the table, and in the moment of distraction have quoted in his stead? . . . I should be glad, if I did commit so enormous a blunder, to give you and the Public all the satisfaction in my power, by accounting for it; but at present I am utterly unable. If you choose to insert the whole or any part of the above in your publication, it is much at your service. Should anything more satisfactory occur, I will trouble you with a few lines. I am glad you have succeeded with the fossil alkali, in irritation of the bladder: it has pretty faithfully served me in such cases." To this Dr. Yeats adds a note in which he gives an account of the case referred to, prints the whole of Dr. Beddoes' letter and his own answer to it, in which he regrets that he cannot find the lost passage, and cannot conjecture where Dr. Beddoes can have come across it. We find, however, on the next page that the reference had been found, and all the fuss had been about nothing, and was of no use, except, perhaps, to give an opportunity for telling us all about Dr. Yeats' success in the bladder case. But although the lost passage had been found, and Dr. Beddoes' panic shown to be groundless, still the good man was not at ease, and wrote again to Dr. Yeats. In this letter he says: "If you can do it, without disturbing the order of your matter, I wish you would introduce, from me, my own censure on the manner in which I have abridged Mayow. It is too rhetorical a great deal; and besides giving this proof of bad taste, I have omitted constant reference to the pages of the original, which I hold to be requisite, in a work of which exactness is the principal merit." If Dr. Beddoes is too rhetorical, Dr. Yeats is rather prosy, and quite lacking in critical power, so that I do not think they can have induced many people to read Mayow's tracts.

But apart altogether from the way in which these advocates of Mayow conducted their case, we can easily see reasons why they could not succeed.

Rightly or wrongly, we regard as scientific heroes those and those only who have contributed in an important way to our knowledge or to our understanding of nature. Now, Mayow might have done this, but, for reasons which we shall consider presently, he did not. All his work had to be independently discovered by others, and it is from them, and not from Mayow, that we have derived our knowledge. A chemist or a physiologist reading Mayow's tract on nitre and the nitroaerial spirit can easily pick out many passages which contain indications by no means obscure of truths not generally known until discovered by others more than a century later; but closely connected with such passages he will find foundationless assumptions and wild reasoning worthy of a mediæval alchemist. Thus he makes it plain that two things, sulphureous and nitroaerial particles, which we can easily translate into modern language as combustible matter and oxygen, are equally necessary in order that combustion may take place, and adds: "But the reason for our notion that it is the sulphureous rather than the nitroaerial particles which ignite, is that the grosser sulphureous nutriment of fire is always visible, while the nitroaerial particles are so fine and subtle that they quite escape the eye, and yet it is quite certain that nitroaerial particles are not less necessary than sulphureous particles for the production of fire." He recognises that the increase in weight which attends the process of calcination (oxidation) of metals is due to the nitroaerial spirit (oxygen) absorbed; he held that all acids contain nitroaerial spirit (oxygen), and that the various acids differ from one another, in that different substances are in them united to the same nitroaerial spirit. In all this he anticipates Lavoisier; but in this very place, and constantly throughout the tract, he maintains, and loses no opportunity of asserting, that heat and fire are not matter, but the violent agitation—if he had stopped there, he would have anticipated a truth unknown to Beddoes and Scherer and Yeats and Lavoisier—but he goes on to assert that heat and fire consist in the violent agitation *of the nitroaerial particles.* So that it would seem that there could be no heat without oxygen. But he knew that heat comes to us from the sun, and that the rays of the sun, concentrated by means of a burning-glass, can heat bodies placed in a vacuum; there must therefore be nitroaerial particles even in a vacuum. These cannot be the heavy nitroaerial particles which exist in air and in nitre, etc., but must be of a finer or more subtle sort; so that his luminiferous ether is a kind of oxygen. Further, he constantly declares that the nitroaerial particles are hard and have sharp cutting edges, that they are the cause of hardness and of elasticity in solid bodies. All this, which I think I may, without disrespect to Mayow, call nonsense, is inextricably mixed up with the description of his ingenious and well-contrived experiments, and with his clear-sighted interpretation of them, so that we cannot tell which is which, except by comparing his statements with what we now know to be true. A wise man once said to me, speaking of a friend who had just left us: "Our friend has a great deal of knowledge, more than we have, on all sorts of subjects, but his knowledge is so mixed up with his ignorance as to be of very little use: the separation of the light from the darkness was as necessary a work as the creation of the light."

But perhaps I have said enough about the discovery of Mayow, and the reasons why his discoverers failed in their endeavour to place his name in the list of great scientific heroes. In any case he is a very interesting man, and his five tracts are well worth reading. I am not without hope that before long we may see them in an English translation, although it is not very easy to translate Mayow. One has to take constant care to avoid the use of words or phrases which have, since the author's time, acquired a special technical meaning; a translator ignorant of the history of the science might, while literally translating the author's words, give an entirely false rendering of his meaning. In the passages I quote from Mayow I have done my best to avoid this error.

The tract to which I wish specially to direct your attention is that of "De Respiratione," although I shall have to refer to others, particularly to that of "De Respiratione fœtus in Utero et Ovo." The tract, "De Respiratione," was his earliest, and it seems to me by far his best, and it has a peculiar interest to Harveians from the intimate relation between respiration and the circulation of the blood.

I shall quote the introduction: "The lungs are placed in a recess so sacred and hidden that nature would seem to have purposely and specially withdrawn this part, both from the eyes and from the intellect. For beyond the wish, it has not as yet been granted to any one to fit a window to the breast, and redeem from darkness these profounder secrets of nature. For of all the parts of the body, the lungs alone, as if shrinking from observation, at once, on the first entrance of light and of self-revelation, cease from their movement and collapse. Hence such an ignorance of respiration, and a sort of holy wonder. Still let me draw near to the inmost vitals, and on so obscure a matter make at least a guess." He then gives an account of the mechanism of respiration, which is exactly what an anatomist or physiologist would give now. It is true his account of the action of the intercostal muscles would not be approved by all physiologists now, for they are not at one among themselves; but some high authorities, I understand, agree with Mayow that the internal, as well as the external, intercostals are muscles of inspiration. He observed, what seems to have been usually overlooked in his time, the double articulation of the rib to the vertebra, and points out that the relative position of the two articulations determines the motion of the rib. He has some interesting remarks on the comparative anatomy of the articulations of the rib. He gives a very neat and very apt illustration of the way in which the lungs are inflated. I shall describe it quite accurately, but in my own words, for there is no need to quote verbatim. Take a common pair of bellows, remove the pipe, cut a pretty large hole in the blade of the bellows in which the valve is, removing the valve altogether; fit a glass window quite tight into this hole; now, tie a bladder to that end of the pipe which fits into the bellows, so that the bladder can be distended by blowing into the pipe; now, push the bladder, squeezed empty, into the body of the bellows, and, closing the blades of the bellows, fasten in the pipe. You have now a cavity between the blades of the bellows and the bladder. This cavity, which has no communication with the outside, corresponds to the pleural cavity, the blades of the bellows to the walls of the chest, the bladder to the lungs, and the pipe to the trachea. Open the bellows, and although the bladder is not connected in any way to the blades of the bellows, air will be driven by the pressure of the atmosphere through the pipe into the bladder, and, of course, when we close the bellows by bringing the blades together, the air will be driven out of the bladder through the pipe. His account of the action of the diaphragm is exactly what we have all been taught; he even mentions that although, on the whole, in inspiration the wall of the abdomen is pushed out by the abdominal viscera pushed down by the diaphragm, there is a part of the abdominal wall drawn in, because of the attachment of the diaphragm to the false ribs. In connection with his account of the action of the diaphragm, he treats of various disorders of inspiration, giving a vivid and clear description of the mechanism of hiccup. Of expiration, both ordinary and violent, he gives the explanation familiar to us all. I may quote here his remarks on violent expiration: "But to more violent expirations the abdominal muscles also contribute. For the obliquely ascending and descending muscles, whose tendons are inserted into the lower ribs, in their contraction draw the ribs downwards and narrow the chest. Further, the whole abdominal muscles, simultaneously contracting, press the viscera which lie under them, so that the diaphragm is driven by their pressure, and forcibly urged up into the thorax. And anyone can find out in his own case that in sneezing, coughing, laughing, and in every violent expiration, the muscles of the abdomen are drawn together and contract. Hence, in laughter and violent expirations, the hypochondria often suffer pain from the contraction of the said muscles. From this we may gather that laughter takes place without any action or contraction of the diaphragm. For the diaphragm is not, as some have supposed, drawn upwards when contracted by repeated irritations; indeed, the diaphragm in systole, in its contraction, as has been shown above, is drawn downwards, and so causes inspiration rather than that expiration which takes place in laughter. From what has been said, it is evident that the power of laughing is peculiar to man, not because the nerve of the diaphragm communicates in man, but not in beasts, with the cervical plexus, and by means of it with the brain—an opinion which the learned Dr. Willis has maintained in his book on the "Anatomy of the Brain." For laughter does not arise because the diaphragm, on account of an instigation brought by the said nerve from the brain, contracts violently with repeated jumps and compresses the lungs, as this learned man has supposed; for it has been shown that laughter does not proceed from the action or systole of the diaphragm, but, on the contrary, from the diastole.

Having explained the mechanism of respiration, he next turns to its use: "This is indeed a most difficult affair, for there is not more accord as to its necessity than doubt as to its use. For not only is air inspired useful for tasting and smelling, and expelled for talking, shouting, coughing, sneezing, spitting, and again, when held in, for the expulsion of other things, the breath we inspire is destined for a nobler use, for so great is the necessity for drawing breath that we cannot indeed live a moment without it. Some suppose that respiration chiefly serves for cooling the heart, but heating rather than cooling seems to suit the circulation and fermentation of the blood. Nor indeed is the more frequent respiration in violent exercise for the purpose of cooling the blood, which the motion heats; for in violent exertions, be they so momentary that the blood is not much warmed. there is certainly need of more intense respiration than in the greatest state of heat and in fevers, that is when the blood boils more, and is, as it were, on fire; so that respiration will be seen to serve, not so much for cooling as for motion itself, as will be shown afterwards." It is worth while for us to pause here, and look at what was Harvey's idea as to the use of respiration. He says: "And now the discussion is brought to this point, that they who inquire into the ways by which the blood reaches the left ventricle of the heart and pulmonary veins from the vena cava will pursue the wisest course if they seek by dissection to discover why, in the larger and more perfect animals of mature age, nature has rather chosen to make the blood percolate the parenchyma of the lungs, than, as in other instances, chosen a direct and obvious course—for I assume no other path or mode of transit can be entertained. It must be because the larger and more perfect animals are warmer, and when adult their heat greater, ignited I might say, and requiring to be damped or mitigated, that the blood is sent through the lungs, in order that it may be tempered by the air that is inspired, and prevented from boiling up and so becoming extinguished, or something else of the sort. But to determine these matters, and explain them satisfactorily, were to enter upon a speculation in regard to the office of the lungs, and the ends for which they exist. Upon such a subject, as well as upon what pertains to respiration, to the necessity and use of the air, etc., as also to the variety and diversity of organs that exist in the bodies of animals in connection with these matters, although I have made a vast number of observations, I shall not speak till I can more conveniently set them forth in a treatise apart." So that Harvey evidently considered the cooling of the blood as the reason why it was sent round by the lungs instead of straight from the right to the left side of the heart. Let us now take up Mayow at the place where we left him. "But the prevalent opinion is that respiration is necessary for life, in order that the blood may be able to pass through the lungs from the right ventricle of the heart into the left. For the fœtus in the uterus, whose blood does not pass through the lungs, but through special ducts, does not need to breathe at all; and this they say is the reason why there is not the same necessity for breathing in the uterus as after birth. But there is no reason why we should say that nature has constructed the lungs with so much skill and labour only that the blood may pass through them after birth, as it might pass by a shorter and much less obstructed road through the same channels as in the unborn fœtus. Nay, it is the case that the blood can pass through the lungs apart from their motion; for if blood or any other liquid is injected by means of a syringe into the pulmonary artery of a dead animal, it will pass well enough into the left ventricle of the heart. And, indeed, any one can feel for himself that, although respiration be temporally suspended, yet the pulse of the arteries in the wrist is strong enough. But this would not be the case if the blood were not passing at the moment through the lungs to the left ventricle of the heart. And this will be made still clearer by what is to be said below. Yet I shall not deny that the movements of the lungs and the compression of the blood vessels, caused by the fall of the thorax in expiration, contribute not a little to send the blood through the lungs. But it is by no means to be supposed that this is the only use of respiration. Hence, some think that respiration serves a further purpose—that, forsooth, of shattering the thicker venous blood, and breaking it up into very small particles, for otherwise, so they say, the blood would separate into distinct parts, serum and a purple sediment. But, indeed, neither is this the chief use of respiration. For any air, however impure, would serve for such a movement of the lungs and shattering of the blood; but contaminated air, or air which has been often sent out of the lungs, is by no means suitable for respiration and the support of life. With respect, then, to the use of respiration, it may be affirmed that an aerial something (whatever it be) necessary for the sustenance of life, passes into the mass of the blood. Hence air driven out from the lungs, from which those vital particles have been removed, is no longer fit for respiration.

"As to expiration, it should be noted that it besides serves the further end, namely, that, along with the air discharged from the lungs, the exhalations caused by the commotion of the blood are also blown out."

Mayow now inquires what it is in the air that is taken up by the blood in the lungs, and concludes that it is the same nitro-aerial spirit that causes fire by acting on the *sulphureous* (*i.e.* combustible particles). It acts in the blood also on the sulphureous (combustible) matter there, not only in the lungs and heart, but all through the arteries, and so produces the animal heat. In a chapter of the tract, "De Sal nitro et spiritu nitro aerio," which is devoted to the Bath waters (you will remember that he practised medicine in Bath), we find a remarkable passage. He has found that water (not Bath water only) contains air which can be expelled from it by heat, and he goes on to say, "To this I add, lastly, that the air interspersed in the particles of water is inhaled by fish for respiratory purposes. And, indeed, the gills with which fishes are endowed seem contrived for this end, that the air (which is absolutely necessary for animal life) may be separated by their action from the water, and most intimately mixed with the mass of the blood. And hence it is that fishes are always alternately drawing in and letting out water, just as terrestrial animals do common air, because a vital aerial something separated by them from the water, as by the others from the air, is sent into the mass of the blood." With Mayow the answer to one question always leads to the asking of another. So here, having shown that the main use of respiration is to bring the vital aerial spirit into the blood, he goes on to ask what good does it do there? He has shown that it produces animal heat, but that is not enough; he goes on to show that respiration and the absorption of nitro-aerial spirit are necessary for motion. He says: "We may then suppose that nitroaerial particles derived from the inspired air constitute the one set of motive particles, the other being the saline sulphureous particles supplied by the mass of the blood; these meeting in the motor parts produce that effervescence from which muscular contraction proceeds. . . . Nor indeed is motion produced in the heart in any other way from that in which it is produced in other muscles, for I do not think that the effervescence which causes the motion of the heart (for reasons given above) takes place in the ventricles, but in the muscular substance of the heart, just as in other muscles. Wherefore, on the cessation of respiration, when that aerial salt necessary for any movement fails, the pulsation of the heart, and consequently the flow of blood to the brain, are interrupted, and death necessarily follows. . . . . . And this further use of respiration can be confirmed. For in active exercise and violent movements there is surely need of more intense and more frequent respiration, not so much that a greater flow of blood may freely pass through the lungs, for we have shown that this can take place without respiration, but because there is a very great expenditure of the nitroaerial salt, through the various effervescences in the contraction of the muscles, so that the venous blood now returns to the heart much impoverished and thick (as certainly occurs also after epileptic convulsions), wherefore, that the effete blood may repair its loss, there is an absolute necessity for more intense respiration. Besides, in violent movements, there must be a more rapid beat of the heart for the more abundant supply of blood, and this could hardly take place without a freer admission of nitroaerial spirit, especially considering the effete state of the blood, so that it would plainly appear that the principal use of respiration is the setting up of the motion of the muscles, and especially of the heart. . . . Finally, according to this hypothesis, we can tell at once whence beasts of burden, that work nearly all their muscles the whole day, derive a supply of explosive material sufficient for so much work, for what the whole mass of the blood is unable to supply, the air, that less impeded fountain, can amply supply." In another place (the tract "de Motu Musculari") he says: "For the continuance of animal motion it is absolutely necessary that there should never be in the mass of the blood a deficiency of saline-sulphureous pabulum and of nitroaerial particles, and the more intensely the muscular contraction is set up, as in very hard work, so much the greater is the expenditure of nitroaerial and of sulphureous particles; and to make good this loss, not only is respiration required, but there must always be taken in greater abundance food crammed with saline-sulphureous particles; hence those foods that contain much volatile salt and sulphur are specially fitted to restore the strength worn by daily labour." In reading such passages, we must always keep in mind that *sulphureous* means *combustible*, and that *food containing volatile, salt, and sulphur*, means foods that will burn with much flame and smoke, in fact *fat meat*. He goes on: "From this we may gather the reason why a pretty intense heat is produced in the motor parts by violent exercise. It is commonly supposed that heat is produced by the motion of the body itself, but in animal motion there is no such friction of the parts, and that is the only way in which motion could produce heat, as to account for so considerable an amount of heat. And, accordingly, we should hold that the heat of the muscles, when they more vigorously contract, is due to the very rapid motion then taking place of the nitroaerial particles in them, as I have endeavoured to show elsewhere, that all heat arises from their motion." Mayow was for some time in doubt as to how the nitroaerial particles ultimately arrived at their destination in the muscles. At first he was inclined to think that they were simply carried there by the blood, but on more mature consideration he concluded that it was more probable that the blood took them to the brain, and that the nerves conveyed them thence to the muscles. I shall quote a passage from the tract, "De Respiratione fœtus in Utero et Ovo."

It occurs among a good deal that is not so clear, and is rather of the nature of what I, a short time ago, ventured to call nonsense. The bright passage is this: "We maintain that the blood of the embyro is sent through the umbilical arteries to the placenta or uterine carunculæ, to bring to the fœtus for its supply, not only nutritive juice, but along with that a little portion of nitroaerial particles, so that it may be clearly seen that the blood of the infant is impregnated with nitroaerial particles by its circulation in the umbilical vessels, in the very same way as in the pulmonary vessels. Therefore I am of opinion that the placenta should no longer be called a uterine liver, but rather a uterine lung." He is not so happy in his explanation of the respiration of the chick in the egg. No one, then, had any idea how readily gases can find their way through an eggshell, and so he supposed that the liquids of the egg originally contain enough nitroaerial spirit to supply the chick, and that this is brought to it along with nutritive juice by the umbilical circulation, just as to the fœtus in utero. But it does not need much, "for as the fœtus in the uterus and in the egg keeps holiday from nearly every movement, except that of the heart alone, a smaller store of nitroaerial particles, whether supplied from the maternal arterial blood or from the liquors of the egg, is more than enough for it."

In what I have quoted from Mayow I have been separating his light from his darkness, and giving you the light; perhaps I ought before concluding to give you a specimen or two of his darkness. He tells us that the nitroaerial particles (which we now quite well recognise as oxygen) are sent with the blood to the brain, there to become animal spirits, and proceed by the nerves to the muscles. I shall not call that nonsense, for we do not know yet exactly what it is that comes along the nerves to the muscles; whatever it is, it is a product of an action taking place in the brain, and dependent on oxidation occurring there; it has some, more or less close, relation to electricity, about which of course Mayow could know nothing. It would be most unfair to criticise Mayow, from the point of view of one knowing something of what has happened during the two and a quarter centuries that separate him from us. But I can criticise him from his own point of view. He tells us that "sulphureous particles are nowhere to be found in the brain, while they are disseminated everywhere through the substance of the muscles." But dried-up brain will burn just as well as dried-up muscles, and the same blood which carries combustible matters to the muscles circulates through the brain. The tired labourer should take plenty fat food to restore the waste of the sulphureous particles in his muscles; this matter can get to his muscles only through the blood, but the very same blood goes to his brain. I quote the following from Dr. Yeats' translation: "As the nitroaerial particles, says our author, are absolutely necessary to the functions of the brain, so the salinosulphureous ought to be excluded from it. If it should so happen, that they get entrance too copiously into the brain, the animal œconomy is disturbed, as happens in intoxication, epilepsy, and similar diseases: for liquors replete with a volatile sulphur, as spirit of wine, and the chemical oil of vegetables, too inconsiderately taken, not unfrequently produce these diseases." So far Mayow, now comes Yeats. "Intoxication, we know, is produced quickest by the strongest spirits, that is, by those which have the smallest quantity of oxygen in their composition, and their other principles in the loosest state of combination. The degree of intoxication, independent of the quantity of spirit taken, will, no doubt, be relative to the excitability of the system. It is not the mere increase of vascular action, nor the stimulus, abstractedly considered, applied to the stomach, which cause drunkenness. That a de-oxygenated state takes place is evident, from the paleness and lassitude which succeed a debauch. With respect to epilepsy," etc. etc. The word "epilepsy" reminds Dr. Yeats of something worth mentioning, and he adds the following note:—"The mention of this disease brings to my recollection a case which occurred under my own observation. At the commencement of the winter, 1796, when I was in London, a man applied for advice for fits, to which he was subject. I mention this, as one of the innumerable impositions practised by the empirics. I found the complaint to be epilepsy. The subject was a shoemaker, æt. 23, had been under the care of an apothecary in town; but, being impatient, and allured by the deceitful handbills daily distributed in the streets of London, he applied for relief to the author of one of them, who told him that the disease was trifling, and should be cured in a week; after some months, he dismissed him uncured, not however before he had taken from him twenty guineas!!! When he applied to me, he had a fit almost daily, attended with considerable sickness and vomiting at times. I concluded that the disease was owing to a diminished energy, connected with dyspepsia; but I knew that, although I removed the original cause, the disease would be continued from habit. I therefore ordered an æther draught to be taken whenever he, in the least, suspected a fit was coming on. This, together with occasional vomits, a proper regimen, and pills formed of the calx of zinc and tartarised iron, restored him to health." I have to apologise for wearying you with this long and perfectly irrelevant quotation from Dr. Yeats, but, as I said that he was rather prosy, I thought that I ought to give some evidence for my judgment. The example I have given of Mayow's nonsense is not a very good one. I selected it partly because I wished to introduce a characteristic specimen of Dr. Yeats' prosiness; I shall therefore give you now a better case of Mayow's darkness. It is taken from the tract, "De Sal nitro, etc." "Thus far we have treated of nitroaerial spirit in its state of motion and vigour, it remains to contemplate it in a state of rest. As the nitroaerial particles in a state of motion are the cause of nearly all natural movements, so, on the other hand, they are the cause, I think, of rigidity, and the power of resilience when quiescent and securely fixed in the pores of bodies. For in order that glass or iron and the like may become rigid and acquire the power of resilience, they must be made to glow in a very hot fire, and then be quickly cooled by being plunged at once into cold water, that so nitroaerial particles conveyed by the fire to the said substances may be obstructed in their movement by encountering cold, and secured more firmly in the structure of these substances. For the same nitroaerial particles which, when whirled round and hot, separated from each other the particles of these glowing substances and opened up their structure, are now, when they cease to move, in consequence of encountering cold, fixed like wedges, or very solid spikelets in their pores. Things are hardened by them when fixed in this manner, and indeed cold seems to close the pores of things in this way only." Again, in the same tract: "Although aerial particles are very minute and are commonly regarded as elementary, still it seems to me necessary to assume that they constitute a compound, and that some of their parts are branchy, and cleave firmly to each other, as if by mutually clasping hooks; while others are extremely subtle, solid, smooth, agile, fiery, and in fact elementary, and that these when firmly fixed among the other particles cause them to become rigid in much the same way as rigidity and elasticity are induced in iron by nitroaerial particles communicated by the fire, as I have previously tried to show. And I think that the elastic force of the air consists in this, that the rigid particles of the air strive to spread themselves out when compressed and bent by the weight of the incumbent atmosphere . . . The rigidity of aerial particles appears to contribute not a little to the kindling of fire, for the nitroaerial particles, on being violently torn from the particles of air in which they were firmly fixed, are thrown into very rapid motion, for I do not see how otherwise the nitroaerial particles could begin their very brisk motion." Passages of this kind abound in all the tracts, as do also passages like those I previously quoted, quite free from this sort of wild, fantastic speculation. We can easily understand how this mixture of keen, clear insight and nonsense came about. We all are very ready to believe that we can by our own wisdom explain everything. There is a good deal to be said for such a view, but experience is against it. Now, in matters of physics and physiology we have two hundred and odd years' more experience than Mayow had; he was very near the beginning of really scientific investigation, he made ingenious experiments, he was an acute and intelligent observer; but he could have no conception of the enormous amount of experimental and observational work to be done before an approximation could be made to an answer to many of those questions which he discussed.

It seems to me that a study of Mayow's works has a very considerable psychological interest, and I feel personally indebted to him for an introduction to the original, simple-minded, enthusiastic Dr. Beddoes.

ERYSIPELAS AND ALLIED DISEASES.

By JOHN T. MACLACHLAN, M.D., *Dennistoun, Glasgow.*

ERYSIPELAS is a disease that crops up, from time to time, in private practice, being more prevalent some years than others, and even at different periods of the same year. The physician is chiefly concerned with erysipelas as it affects the face and scalp; while those forms attended with much destruction of the subcutaneous tissue come chiefly under the purview of the surgeon. Occasionally it takes an epidemic form, chiefly, however, among a number of people or patients living in the same building, hospital, or institution. I have seen the disease in an epidemic form in a Highland parish, namely, that of D.; but, owing to the native shyness of the Celt to visit a house where an infectious patient resides, a sort of natural quarantine is enforced, which greatly tends to check the spread of contagious or infectious diseases. Moreover, in a particular epidemic, some cases may be mild, while others are quite the reverse. Much, therefore, will depend on the living body in which the virus sojourns. This again is related to inherited peculiarities of structure or of function. For it is an undeniable fact that erysipelas attacks some members of a family with readiness, even recurring again and again in susceptible subjects, up to old age. Yet I have never heard of such a susceptible patient dying from erysipelas of the face when attacked in old age. It would appear that the more frequent the attacks, the less virulent does each succeeding attack become. This, however, is scarcely true of a person being attacked in old age for the first time, and is only true of the so-called medical erysipelas.

Much discussion has taken place over the question, Is an abrasion or fissure or some tiny breach in the skin necessary before erysipelas will attack a person? All that can be said at the present moment is, that the evidence for and against the doctrine is not conclusive. It is true that that great observer, Trousseau, held the view that a breach of the skin was necessary, and Volkmann has been able with a lens to satisfy himself that a breach can be often detected in cases of erysipelas. There are grounds for believing that the virus may be inhaled into the lungs, and cutaneous erysipelas result. Graves relates the case of a young man who declared he got a "whiff of sickening air from the bedclothes," where his mother lay suffering from erysipelas, and immediately he fell ill with the disease in a virulent form, and succumbed. It is conceivable that the virus may penetrate the unbroken skin, if rubbed in, when we consider the excessive minuteness of the micro-organisms associated with this disease. And as the disease so often attacks the face—an exposed part of the body—the question of the towel used in drying the face and the manner of towelling may be pertinently raised.

Another question regarding this disease, and one not yet definitely settled, is—Are the diseases known as ordinary facial erysipelas, and cutaneo-cellulitis, and ordinary surgical cellulitis identical, differing only as regards the locality of the pathological processes; or are these three diseases fundamentally distinct, yet presenting certain common features, and caused by allied yet different species of germs? Here the bacteriologist cannot help us much, so far as he finds the organisms present in all three diseases to be so much alike as to be by any known tests indistinguishable. That sagacious physician, Sir Thomas Watson, classed ordinary erysipelas among the exanthemata, and appeared to think it was radically different from the so-called surgical forms. He looked upon the local signs of the disease, the redness and the swelling with the heat and burning pain, as the eruption, and so comparable to scarlet fever, diphtheria, or smallpox. It had its period of incubation, its sudden invasion, its speedy decline, with concomitant desquamation, and even vesicles and bullæ were frequently present. There was no drug known could check the full-blown disease. Thus, analogy is intensely strong, which further does not lose its force, whether the disease enters by a portal in the skin, or the breath, or other channel; for, assuredly, it must enter somewhere. Specific diseases remain specific diseases, no matter by what channel they enter or leave the body.

As Sir William Gull remarked, the body is not made up of parts, but different localities. The fundamental element of a disease is not the general character of the lesions, not the question whether there be much effusion, or if the effusion be chiefly liquid or rich in cellular matter; but what is the nature of the active agent producing the disorder, and generally to be found at close quarters to the lesions. The gross pathological changes do not in themselves constitute a safe basis for differentiation.

In two epidemics of erysipelas I have watched, the disease began in the ordinary cutaneous form, and cases of cellulitis sprang up afterwards. This would at first sight suggest, both diseases were identical in origin. It might be further suggested, that the virus of erysipelas acquired a special activity and intensity, having been cultured in the living body, and that fresh infection would be apt to be severe, thus resembling scarlet fever simplex and scarlet fever maligna.

My own opinion is, that the different forms of erysipelas are due to different species of germs, which flourish under similar conditions of environment, and that, if cutaneous erysipelas is about, the other forms are apt to appear. Fehleisen found that experimental inoculation of the *Streptococcus erysipelatis* was followed by the disease in its typical form.

It is important, clinically, to regard the various forms of erysipelas as closely allied, and so to speak "sailing in the same boat." It will warn a man to carefully disinfect his hands before examining a patient, the subject of cutaneous erysipelas; and likewise carefully to do so, after attending such cases, and before examining a woman in labour, or wounds of any description. The neglect of these precautions has cost many lives both in the profession and out of it. The disease germs cannot be scrutinised by the unaided eye, neither can minute cracks or fissures; and the fatal assault is dealt in the dark, only to be realised by mental vision. Ordinary cleanliness is not enough in the way of prevention. Were such the case, many if not most skin diseases would not exist. As indicated above, the epidemic at D. began with a cutaneous case of erysipelas affecting the face. There was nothing remarkable about the case. The patient, a fisherman, was doing ordinary labour work, in opening up the ground for the laying down of water pipes in the town. At one particular part of the place, human bones were exhumed. The patient declared he sickened off them. It is curious that these operations, the laying of the pipes, had been going on for months, and it was only when human remains were disinterred that the disease broke out. Fagge mentions that in the Middlesex Hospital some cases of the disease appeared to be related to a foul dustbin in the vicinity.

My patient lived in a fishing village, some two miles from the town, the seat of operations. In that village the disease spread, and assumed a great variety of forms. There were several cases of ordinary medical erysipelas, many cases of localised infective inflammations, some severe, others quite trifling. Abscesses formed about the neck and shoulder, the arms and legs. A few cases began with a sort of whitlow, rapidly spreading upwards, and requiring amputation of the gangrenous finger, and free incisions in the arm.

In the same hamlet a fine young fisherwoman (who as a rule do not wear boots even in cold weather) got a cut on the sole of the foot by a small piece of glass. She thought nothing of the matter. When I was summoned to see her, I found a gangrenous condition of the foot setting in. She was treated actively by incisions, etc., but she rapidly sank in a few days from pyæmic inflammation in the lungs and shoulder joints. That was the only death from the disease in that village.

Several patients were dangerously ill from spreading cellulitis, and were only saved by active surgical treatment.

In the town of D. itself, only a few cases of ordinary medical erysipelas occurred, and a few poisoned fingers.

One case (CASE 1), however, was that of a robust middle-aged woman, who sickened and went to bed. She complained of an intense pain in the stomach, which was somewhat tender on pressure. She was not feverish, neither did she vomit any. I was puzzled as to its nature, and gave her some anodyne medicines, without adequate relief. Her pulse got rapid and weak. In a week she developed a sharp attack of erysipelas on the face, and the severe gastric pain immediately subsided.

CASE 2 was that of a servant lass, who had a sharp attack of facial erysipelas, extending over the scalp. About the fourth to the fifth day of the disease, she became semi-comatose, and her jaws were locked in a sort of tetanic spasm. She was fed by the nose. I put a blister on behind each ear one night, and was surprised next morning to find the jaws unlocked, and that the patient was conscious. She made a good recovery.

Sir Thomas Watson states that coma is a cause of death in bad cases, and that in such cases serous fluid is usually discovered beneath the arachnoid, or in the cerebral ventricles; and that the veins of the pia mater are turgid. Watson makes no allusion to the use of blisters. Nor, indeed, can I say I have seen them recommended anywhere. Yet it is rational to use blisters when coma sets in, as it may be a sign of pressure on the brain, and not entirely due to toxæmia.

CASE 3.—A young, healthy mason, who was working in the fishing village, returned one evening to his home, some four miles away among the hills, feeling very unwell. I saw him next day, and found he was suffering from severe pain in his left side, with well-marked pneumonic crepitation at the base of the left lung. He seemed felled by the disease. In a few days the signs of diffuse cellulitis on the same side appeared, and I despaired of his life. The pneumonia cleared up in ten days, but acute suppuration set in in the cellular tissue extending from sternum to within a few inches of the vertebral column. This accumulation of pus was let out, by free incisions, and nearly a chamber-potful of pus and bloody discharge was liberated. He was restored to working condition in five months.

This case was probably the most critical of any I have attended during a period of ten years. The result, however gratifying, was clouded by the fact that his aged mother and strong young brother (æt. 30) died in a few days from what seemed to be an overwhelming dose of the poison.

These cases are interesting and unique in my experience.

CASE 4.—The mother felt sick one evening, and complained of a violent pain at the pit of the stomach. Her pulse got rapid and hard. She died in forty-eight hours, without any discoverable lesions of any kind. Death apparently resulted from heart failure. Her mind was clear to the last.

CASE 5.—The brother fell sick in a similar way, with a most agonising pain in the stomach, bilious vomiting, quick pulse, and rise of temperature. He had had some ordinary bilious attacks during his lifetime. In less than four days he died from asthenia, and the nature of his death and that of his mother still remains a mystery to me.

Sir Thomas Watson thought that apnœa from the disease, extending to the larynx, was the explanation of many mysterious, sudden deaths from erysipelas, but his explanation does not apply to the above cases. Malignant endocarditis might be suggested. I am afraid nothing short of a post-mortem examination could have revealed the cause of death. The above two fatal cases, beginning with intense pain in the stomach, are interesting if considered with Case 1, who recovered. I may remark, the brother who died was greatly perturbed in mind lest he should catch the infection. A robust daughter and the aged father fortunately escaped. The daughter was constantly in touch with the sick, but kept an easy mind.

CASE 6.—Some nine years ago, in the village of D., in Ayrshire, I delivered a young, florid-complexioned woman of an illegitimate child. It was a hot and sultry month. Many cases of throat trouble were about, but no unequivocal case of diphtheria or scarlet fever was diagnosed. Three days after delivery the patient got feverish, with a tender womb. Ergot and opium and a few douches speedily set matters right. I thought the patient was quite well, when, in eight days from delivery, she developed a smart attack of cutaneous erysipelas on the lower part of the abdomen. Several bullæ appeared. The disease spread upwards towards the chest, the upper outline of the blush being concave, that is to say, spreading quicker at the sides than at the centre of the abdomen, no doubt owing to the close connection of the skin and subjacent structures at the centre of the belly. It spread with mathematical symmetry.

This woman fell into an extremely critical state, with a very quick pulse, 120–130; her abdomen became tympanitic, and exquisitely tender on pressure. She complained of a severe diffuse pain over the abdomen. She lay with her legs drawn. The facial expression indicated that she was suffering from a severe abdominal affection. In fact there was no doubt that acute diffuse peritonitis had set in. She recovered.

The celebrated Robert Graves observed how the spread of cutaneous erysipelas is apt to be in a symmetrical manner on each side of the mesial line of the body, and also pointed out how anatomical considerations tend to check or modify the march of the disease.

Fagge mentions that Wilks has related two cases of a similar character, which terminated fatally. It is interesting to record, in connection with the above case, that she had had two attacks of facial erysipelas previously.

Puerperal peritonitis is known to be readily set up in recently delivered women, by the nurse or attending physician conveying the infection. Pelvic cellulitis is closely related to surgical cellulitis, which again has affinities with ordinary erysipelas.

CASE 7.— My sister was delivered of a female child by two physicians, who were also eminent surgeons in the town where she resides. It was a breech presentation, and forceps were used. Things went on well for a few days, when she became feverish, and felt unwell. There was a rupture, involving vagina and rectum, about 2 in. long and about 2½ in. above the ostium vaginæ. Puerperal peritonitis developed. Her pulse was 145; temperature, 105°; abdomen blown up. She was drowsy, and almost comatose. She was fast sinking. I telegraphed to my brother, Dr. William A. M'Lachlan, Dumbarton, the state of affairs, and at his suggestion the patient got a pill of opium (½ gr.), digitalis (½ gr.), and quinine (1 gr.), every two hours. She was freely stimulated, had mustard poultices to the abdomen, and got ice for the vomiting. She rallied, and regained consciousness. In three weeks a large effusion became perceptible, above the pubis. It was aspirated, and a dark brown grumous-looking fluid was drawn off, which showed under the microscope much granular and fatty matter, broken-down pus cells and blood, and crystals of fatty acids. In another fortnight a peculiar discharge came from the bowels, indicating that the effusion had burst into the descending bowel. Abdominal section was performed, and a large tube inserted. A great quantity of pus was liberated. The abscess cavity closed to a certain point, but no further, and refused to heal. Septicæmic sweats were profuse, and continued for a long time. Dr. Alexander Patterson corroborated the diagnosis of peritonitis going on to localised abscess formation. He established an opening in the vaginal roof for purposes of proper drainage. In due time the abscess cavity closed, and appeared to be much benefited by weak injections of iodine.

CASE 8.—On the 28th January of this year (1899) I was called to see a middle-aged woman of exceptionally sound and vigorous constitution. She complained of a severe pain in the axilla, very tender over the divisions of the brachial plexus. She was feverish, and felt very unwell. She could give no adequate explanation of her illness, except that it began with shivering fits.

In a few days it was clear she was suffering from diffuse cellulitis, which spread down towards the iliac crest, and was bounded by the pectoralis major on the one side, and the latissimus dorsi on the other. She fell into a typhoid condition; pulse 140, soft in character; temperature, 104° F.; tongue, dry and baked-looking; nocturnal delirium present. She complained of her mouth and throat, and had difficulty in swallowing owing to the painful condition of the mouth. The mucous membrane of that region was inflamed, and vesicles appeared on the tongue and palate. The local application of 10 per cent. cocaine gave much relief, and facilitated the taking of nourishing foods. In due time free incisions were made, under chloroform, and much pus liberated. She recovered completely in three months.

On minute investigation of this case, I found the patient had been tending a recently delivered woman, who had an abscess on the abdominal wall, which my patient was poulticing. She got a scratch on the dorsum of her hand by a crochet pin. The following day she was removing some soiled dressings from the discharging abscess. She asserts that she sickened that very day, and on the same night had the severe pain in the axilla, sending for me on the third day of her illness. No lesions of any kind could be detected on the arm or hand. The faint mark of the healed scratch was just perceptible.

Sir Thomas Watson pointed out the frequency of throat implication in cases of ordinary medical erysipelas, and the above case tends to strengthen our belief in the close affinity of surgical cellulitis with the so-called medical erysipelas.

Cases of empyema resemble erysipelatous cellulitis in the virulence of the contagion, and many members of the profession have died of pyæmia, through getting a small prick during the operation for empyema, thus pointing out the great necessity of using antiseptics and not trusting to mere cleanliness.

I was privileged to act as an assistant in a lunatic asylum for a year, and saw a mild outbreak of erysipelas in its wards. Most of the cases were of the cutaneous form; but there was a severe case of cellulitis in a demented man, involving hand and forearm. The hand was livid and gangrenous-looking in some parts. Twenty incisions from first to last were made, with much antiseptic fomentation. He recovered, with stiff sclerosed tendons, and with little power over his fingers.

The disease was speedily checked by fumigating the wards with eucalyptus oil for several days.

Personally, I had two mild attacks of the disease on one ear, which was finally stopped by the repeated use of a lotion of corrosive sublimate (1–1000).

The above considerations lead me to believe that cutaneous erysipelas and surgical cellulitis and pelvic cellulitis and peritonitis are closely allied; that while cellulitis is apt to follow in the wake of cutaneous erysipelas, a converse sequence is exceptional; that the conditions that breed the one distemper engender the others; and that that treatment will be best which is inspired by those notions, both in the way of prevention and cure.

Prognosis.—Uncomplicated erysipelas is not a fatal disease. In drunkards, severe head symptoms may set in, and death from coma (which is probably uræmic) take place. Occasionally, the patient may be overwhelmed by the poison, with rapid death, as in the two cases cited above, thus resembling the malignant forms of scarlet fever. In the two malignant cases, severe gastric pain was a prominent symptom.

Treatment.—In uncomplicated cases of cutaneous erysipelas no special treatment is required, beyond supporting the patient, favouring elimination, and using antiseptics locally to the affected parts. As a further precaution, the air of the sick-room or ward might be charged with vapour containing eucalyptus oil, which proved effective in checking the spread of the disease in the asylum alluded to above. These preventive measures can scarcely be dispensed with, considering the risks tiny scratches on the body expose one to; and, further, we cannot estimate beforehand the inherited tendencies that exist in some individuals to this disease.

Many drugs have been vaunted as specifics, particularly large doses of tinct. ferri perchlor. But I have not been able in my own experience to support Bell and others who have taught this doctrine. I have given in several cases as much as 30 minims every hour, in the hope of arresting the disease, but have been unable to satisfy myself that the medicine exerted any peculiarly curative influence. Whatever tends to contract the capillaries of an inflamed area is likely to do good, in diminishing the exudation and so the tension and pain of the part. Iron is likely to do all this; but there, I think, its influence stops. Moreover, it would not be difficult to bring a body of evidence in favour of any drug in a disease that spontaneously subsides.

Not a few drugs, while not markedly affecting the pathogenic cause of a disease, do good by influencing the morbid products of the disease, either by causing or promoting their absorption or checking their accumulation, and, so to speak, relieving the mechanical disabilities of the affected part. Under this head I place aconite (praised by Ringer), purgatives, diaphoretics, etc., all of which may be more or less useful, when properly used, although in no sense curative.

With regard to surgical cellulitis and its congeries, I suppose little doubt exists as to there being no specific drug. In such circumstances the best treatment is to conserve the vital processes, an expression used by Gull in regard to any treatment. This object is achieved sometimes by what seems to be diametrically opposed lines of treatment. There is the patient and his disease. What seems best for the patient may not be best for that part of him the seat of morbid action, and *vice versâ*. When in doubt, one must treat the patient, and take the cue from the general state of the body and not from the local affected part.

The surgical forms of the disease, including puerperal peritonitis, and, for that part of it, even septic pleurisy, I have been in the habit of treating in the following way:—

Dietetic.—I rely chiefly on brandy, eggs, and milk, with good beef-tea by way of a change. The brandy I use as a food and a dietetic stimulant, giving one or two teaspoonfuls hourly in bad cases, with about a wineglassful of milk, or egg and milk whipped, with some sugar added or a corresponding amount of beef-tea.

It is of great importance to regulate the quantity of food given to a patient, according to the powers of the stomach. A patient may take a wineglassful of liquid food hourly, whose stomach could not tolerate a cupful every two hours. Sometimes it may be necessary to give only a tablespoonful or even a teaspoonful at a time, frequently repeated. If the stomach is very irritable, and vomiting set in, I withhold food by the mouth for several hours, giving the patient a teaspoonful occasionally of weak brandy and water (a teaspoonful to the wineglassful), and apply mustard poultices to the epigastric region. This generally succeeds. When the vomiting stops, food may be cautiously given.

In regard to the question of stimulants in acute disease, I have never been able to disabuse my mind of the idea that it is possible to poison a sick person with alcohol, as well as a healthy individual, by its indiscriminate use. It is true that some diseases, *e.g.* diphtheria, would seem to make a sick person more tolerant of alcohol. Nevertheless, I prefer to give ammonia when a pure stimulant is required. I look upon repeated narcotic doses of alcohol as dangerous in critical illnesses, as tending to paralyse the higher centres, and to unhinge the nervous mechanism generally.

Sir William Gairdner has, for the last thirty or forty years, championed the cause of great moderation in the use of stimulants in acute disease. His teaching and his experience may be said to have given the death-blow to that of Todd's, which consisted in pouring in alcoholic stimulants in proportion to the weakness of the patient. Indeed, Gairdner's teaching practically amounts to this, namely, that alcohol should be used in acute disease on the same lines as in comparative health, "to quicken and develop the appetite for real food and the power of assimilating it." And that stimulants should not be given except with food, unless for the purpose (as a drug) of procuring sleep. Gairdner regards alcohol—even if hypothetically a food—a bad food in acute disease. And his successful record of the treatment of cases of typhus fever was achieved without employing alcohol at all, in the vast majority of his cases. I agree entirely with Sir William Gairdner's teaching, except that I regard alcohol as a food in acute disease, as well as a dietetic stimulant; only it is a food that must be given in small quantities and in a diluted state, to avoid its exhausting stimulating effects and imperfect assimilation.

A very sick patient is practically a starving one, and very large doses of alcohol cannot be a fictitious danger. During the night, the patient should be fed twice or thrice at least. Little and often is my motto, both in regard to food and drink, in severe illnesses.

Medicinal.—In the diseases under consideration, there are three drugs I pin my faith to, namely, opium, digitalis, and quinine, given, in my opinion, in the order of therapeutic merit. I prefer to give them in pill form. The dose of the several ingredients may be altered to suit the exigencies of the case. I generally give 1 gr. opium, 1 gr. quinine, and ¼ gr. digitalis, every two, three, or four hours, according to circumstances. The combination of these three drugs in pill form generally goes by the name of Niemeyer's pill. It is most valuable in supporting the circulation at the dangerous period of an illness, preventing death from heart failure—the common cause of death in acute disease. I attribute the successful issue of most of the cases narrated above as chiefly due to this pill.

Many years ago, my respected preceptor, M'Call Anderson, announced that he had successfully combated cases of galloping consumption by a similar combination, with ice cloths to the abdomen to reduce the pyrexia, and liberal supporting dietetic treatment. M'Call Anderson's practice has been endorsed by practical men. Latham thought that small discriminating doses of laudanum saved persons in fever who would otherwise have died. Graves was a great lover of opium in acute disease. Watson gave a caution to withhold opium if the lips indicated imperfect aeration of the blood.

Opium seems to have a marked influence over necrotic processes in the body. Dr. Alexander Patterson, Glasgow, teaches that it alone will stop phagedæna and syphilitic gangrene. Such clinical experience would suggest a large sphere of usefulness for opium in erysipelas and allied diseases.

Digitalis steadies a heart galloping to destruction. When peripheral resistance in the capillaries is greatly diminished, as indicated by a fluttering, indistinct, and excessively rapid pulse, digitalis is urgently called for.

The heart rapidly fails when the peripheral resistance is withdrawn, and the timely use of digitalis will save life. In the early stage of an acute disease, when the pulse is heard, I omit digitalis from the pill, adding it when the hard quality goes, and a soft easily obliterated pulse appears.

Quinine is a valuable tonic to the capillaries. Its chief virtue as a therapeutic agent, in my opinion, is due to its marked antiseptic properties. It acts on muscle fibre in this respect not unlike ergot, and is of great value in bracing up the capillary circulation. Whatever may be the true explanation of these drugs, we have in Niemeyer pill a combination of the first therapeutic rank.

I should like here to say that great credit is due to the late Sir George Johnson, in pointing the rôle the muscular coat of the capillaries play in the phenomena of disease, and the indications they furnish for rational treatment.

In some of the diseases under consideration, severe continuous pain and a more or less persistent high temperature may be striking features, and constitute a great danger in themselves, tending to quickly reduce the vitality of the patient, if not relieved. Niemeyer's pill suits such cases well, and under its use I have not personally had recourse to baths for the reduction of the temperature. Tepid sponging and pure air are great helps in such cases. It is advisable not only to have fresh air in the bedroom, but even about and in the bed.

The skin is the great agent by which the temperature is regulated. It seems contrary to reason to endeavour, by relays of blankets, to keep the patient as warm as possible in pyrexial conditions. Cool air does not kill a fever patient, although draughts may. On board a ship, in the tropics, I witnessed a fall of 3° F. in the temperature of a fever patient (typhoid), who was put on the hatches, with a tarpaulin tent covering. It rose immediately on his being put back to his bunk, in consequence of coaling operations, and fell as speedily when he was removed to his open air tent. He made an excellent recovery, although he was semi-comatose, with incontinence of fæces and retention of urine (relieved by the catheter) for a week.

Local treatment.—Cutaneous erysipelas has already been touched upon. In the surgical forms of the disease, fomentations and poultices impregnated with some antiseptic, are decidedly beneficial. They hasten suppuration, relieve tension, and are comforting to the patient. I think most cases of blood poisoning do best when local suppuration results, which, when occurring, has to be dealt with in the usual manner. Remembering that where skin and underlying textures are closely united in the body, erysipelas is apt to receive a check, a useful lesson may be drawn. As a rule, cellulitis is not conspicuous on the back of the arm. If a patient is inoculated on the back of the finger, the disease only spreads a little way up the back of the arm, but advances rapidly up the forearm, receiving a check, complete or otherwise, at the bicipital fascia. All this would suggest the propriety of applying suitable pressure above the diseased area, by using freely cotton-wool padding and firm bandaging.

CASE 9.—A carter, middle-aged, came under my care on the 1st April 1899. On the previous day he was carting bags of manure (composed of putrid blood, offal, etc.). At 12.30 A.M. the following morning he awoke with an intense pain in the back of the left hand, wrist, and above the wrist for about 4 in. He said he thought his hand was paralysed. I told him he had blood poisoning. The whole hand was greatly swollen, with a red blush on the back of the hand, and spreading up the arm. I enveloped the parts in cotton-wool, and bandaged the whole up firmly. The same night he was quite free from pain, and two days afterwards the swelling was gone, and the blush very faint. We dispensed with pressure, but in other four days all the signs and symptoms returned. I tried pressure again, but he could not bear it the second time. Free incisions were made; one at the base of the little finger gave exit to about 2 drms of pus and débris. No pus came from the other incisions.

Had the pressure been kept up at the beginning for a considerable time, the disease might have localised itself at the little finger, the source of the whole mischief. The case presents no other noteworthy features.

PYLOROPLASTY.

By Rutherford Morison, F.R.C.S., *Surgeon, Royal Infirmary, Newcastle-on-Tyne.*

No surgical operation has ever been followed by more brilliant results than pyloroplasty. The first case on which I performed the operation was a female, æt. 48. The day before the operation (15th Oct. 1894) she weighed only 5 st. 4 lb., her stomach required daily washing out, and would retain only the smallest quantity of liquid nutriment. She was dependent almost entirely on nutrient enemata, and, to cut a long story short, was within a few days of death. The operation of pyloroplasty was done for her on 16th Oct. 1894.

In March 1899, in response to my inquiry, she writes to say: "I weigh 10 st. 12 lb., can eat anything, and never felt better."

The only exceptional feature in this case is the fact that the patient has more than doubled her weight since the operation, otherwise the result is such as my experience has led me to expect after operation on suitable cases.

In the *Lancet*, London, of 26th Feb. 1898, I published an abstract of eleven consecutive cases, and there and elsewhere, almost in season and out of season, I have written and spoken on pyloroplasty. The operation was introduced by Professor Mikulicz of Breslau for stricture of the pylorus, but my knowledge of it was derived from a short note by Professor Senn of Chicago, to whom the English-speaking surgical world is more indebted than to any other author.

The *diagnosis* of pyloric stricture is based upon the history of the illness which is given by the patient, and the physical signs which are discovered by the doctor.

The history given by the patient is of long-standing dyspeptic symptoms, frequently commencing with those which are characteristic of gastric ulcer, namely, pain aggravated by taking food and relieved by vomiting, or less definite symptoms, such as are common to all dyspeptics, namely, vertigo, pronounced constipation, depression of spirits, marked emaciation, and loss of appetite. The most suggestive point in the history, however, is the story which the patient tells as to vomiting. Such a patient will frequently remark that he vomits so large a quantity that he does not know where it all comes from. He will also perhaps say that a portion of cabbage leaf or orange, or other recognisable substance, came up undigested more than twenty-four hours after it had been eaten, or he will describe the vomited matter as having a bad smell, and, in addition, having a scum or froth floating on it, which is like yeast. This story is almost conclusive evidence of a dilated stomach.

The physical signs are two. One of these is constant, the other is frequently found if carefully looked for.

The sign constantly present is the evidence of dilatation of the stomach. To seek for this, the patient should be laid flat on his back, and the abdomen fully exposed and carefully watched for a few minutes. In this way the most definite evidence of dilated stomach may be obtained. Owing, I suppose, to the exposure of the skin covering the abdomen to the cool air, contractions of the stomach walls are set up, and the outline of the stomach can be plainly discerned through the thin abdominal wall. In one case I examined in this way it was easily seen that the stomach reached the pubic bone. This, however, was an unusual amount of dilatation. It is more common to see the outline of the greater curvature of the stomach in the neighbourhood of the umbilicus. During the time of the contraction the patient will sometimes groan with pain, and will blame the swelling for all his trouble. He is likely to say that this same swelling frequently comes in the evening and causes great pain, till it produces vomiting, when he is quite comfortable till food is partaken of again. A distinct peristaltic wave may be seen to pass from left to right in this swelling before its subsidence. This suggests that the swelling is stomach and not colon, in which the peristaltic wave would pass from right to left. Sometimes, though rarely, I have felt the stomach walls become firm to the overlying hand. A very strong contraction like that of a pregnant uterus, so far as I know, does not occur in the stomach in chronic cases, because the dilatation is in excess of the hypertrophy at this time; but such strong contraction can occur in the intestine, so that this observation may be of considerable diagnostic service. If this condition of painful contracting and enlarged stomach be present, there is positive knowledge that the outlet is obstructed and that the cavity is dilated. If no swelling becomes visible on exposure, the epigastric region should be rubbed and ballotted, after which visible peristalsis should again be looked for. By the ballottement over the stomach further evidence of stomach dilatation will be obtained; the splashing of fluid contents will be heard with each movement of the hand or hands, and that over a larger area than usual, and continuing for a longer time than occurs in normal states of the stomach. If these methods fail to demonstrate the dilatation, which from the symptoms should be assumed to exist until the contrary is proved, the two halves of a large seidlitz powder may be administered separately, when the gas generated in the stomach will distend it and make its outline visible. If the patient, as is not infrequently the case, has been in the habit of washing out his stomach, the same result will be more readily obtained by blowing up the stomach with a bicycle pump, through the stomach tube, and at the same time the quantity of water which the stomach will hold may be ascertained by accurate measurement. The normal stomach will not tolerate more than 1 quart. Additional evidence may be obtained from careful percussion, by which the area occupied by the stomach may be mapped out, and this is still more certainly done by combining auscultation with the percussion. This combined method is of considerable value when properly applied, and is not sufficiently practised. A binaural stethoscope is essential. This is placed over an area under which the stomach is certainly lying, and whilst listening over this area the examiner gently flips the abdominal wall with his finger, commencing at a part removed from the stomach and gradually approaching it. As soon as the percussing finger strikes over the stomach area, the sound conveyed to the stethoscope is so loud and characteristic as to be unmistakable. By marking the outline gradually all round, the presence or absence of dilatation may be determined with certainty. Unless dilatation is present, the case is not a surgical one. The fact of dilatation being settled, further useful information may be obtained. The other sign mentioned as frequently to be found is to be carefully looked for.

A large number of pyloric strictures are due to cicatricial contraction of pyloric ulcers, and when the ulcer heals, a hard nodule is left. Through the thin abdominal wall, it is surprising how small a thickening can be discovered by careful examination. The nodule is generally to be found a little to the right of the middle line and above the umbilicus, but usually not far removed from it. As a rule it is tender when pressed upon, and once touched the patient is able to say when it has been arrived at, on subsequent examinations. In addition to making out the presence of this nodule, the examiner should ascertain its mobility. This can be done by getting the patient to draw long breaths, when, if the nodule is not fixed, it will ascend and descend with the respiratory movements. Also, on turning the patient on to one or the other side, its mobility or otherwise may be determined. The presence of a movable nodule, in addition to making the diagnosis complete, is of great practical importance, for it means that an operation is demanded, and that it is likely to be an easy and successful one.

A patient comes with the history of long-standing stomach trouble, tells a story of foul vomitings, especially towards night, is very thin, has a largely dilated stomach, and a nodule which is movable at the pylorus. The diagnosis is cicatricial stricture of the pylorus, with secondary dilatation of the stomach. What is the treatment, and what is the prognosis? Treatment by medicine and by diet, if it has not already been proved a failure, can promise nothing but at the best slight palliation of the symptoms. A semi-starvation diet of easily digested fluid foods may enable the patient to live in comparative comfort for some time longer, so may regular washing out of the stomach, but to regain good health an operation is essential. The pyloric stricture cannot be cured by medicine, or by diet, or by lavage, and it is unusual to find now a patient object to operation, when the facts are fairly laid before him. A patient sent to me by Dr. Kimpster of Gateshead, gave a history which illustrates remarkably well the course of such cases. For eight years he had been a martyr to dyspepsia, and had tried all sorts of treatment. For a time he had usually obtained a certain amount of relief from each new form of treatment tried. During the eight years of his illness, in spite of periods of improvement, he had made sure progress downhill. He had been a very big, strong man, originally weighing over 16 st., and leading the healthy life of a sporting country gentleman. When Dr. Kimpster saw him he had been an invalid almost entirely confined to the house for several months, and was only able to exist by limiting his diet to peptonised milk and by frequently washing his stomach out. Notwithstanding the fact that the patient had been advised in London that an operation was unlikely to benefit him, and would be attended with grave risks, he willingly listened to Dr. Kimpster's suggestion that pyloroplasty should be done. Three months after the operation this gentleman was able to enjoy and digest a beefsteak and porter, and had returned to his active life.

The gravity of pyloroplasty has, I think, been over-estimated, for I published[1] eleven consecutive cases, all of which recovered, and I have now operated on ten other cases, making twenty-one consecutive cases without any death. I feel confident that no other grave abdominal operation could have been performed with no mortality on patients so feeble and reduced as most of those were.

The preparation of the patient.—The same preparation for this operation is needed as for an ordinary abdominal case. In my article on wound treatment I have given in full detail the methods I employ to insure surgical purity of the skin of operator, assistant, and patient, and the manner of preparing instruments, etc., and the dressings I advocate. The only special preparation relates to the intestinal tract. Many of these patients cannot be properly evacuated by ordinary measures, so that, in addition to the usual purgative, I like to insure that their colons shall be thoroughly emptied by ordering a large enema (3 to 4 quarts) of salt water hot (1 drm. of salt to 1 pint water) to be slowly administered through a long tube and funnel, in the knee-chest position, for two or three consecutive days before the operation. The cleanliness of the colon allows full use of nutrient enemata after the operation, should they be needed.

It is usual to wash out the stomach in these cases before operating, and the chief reason advanced in favour of this measure is that the stomach cavity is cleansed before the operation, and that there is consequently less risk of wound infection from its contents. I doubt all this. It is too mechanical and theoretical a view to commend itself to me, nor do I think the possibility of it being correct sufficient to induce me to ask the patient to suffer grave discomfort and some risk to uphold it, and in my cases the stomach is not washed out. If the patient is exceptionally feeble, I order a small dose of spirit to be taken half an hour before operation, and a nutrient enema of 3 oz. of beef-tea and milk to be administered. Before commencing the operation, all instruments which may possibly be required should be prepared and ready for use. It is important, in greater degree than in almost any other operation, to keep the patient as short a time as possible exposed on the operating table, so that no trouble should be avoided which will help to shorten the operation. The room in which the operation is to be performed should be well warmed (not less than 65° F.) before the patient is brought into it. The patient should be well protected from chill by bandaging small blankets on arms and legs, by sufficient woollen clothing, and on the table should be surrounded by hot bottles. I prefer in this, as in most of my operations, to have chloroform given first, till the patient is well under, then to continue the anæsthesia with ether, on an Ormesby's inhaler, unless the ether causes strong abdominal respiratory movements, when chloroform is readministered.

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[1] *Lancet*, London, 26th February 1898.

The operation.—The abdomen is opened between the sensiform cartilage and the umbilicus, and almost from one to the other point. In this, just as in every other operation, the external incision should be large enough to allow of favourable inspection and of unfettered manipulation. It has to be borne in mind that the patients are thinner here than at any other part normally, and that the emaciation of the patient added to this makes it easy for a careless operator to get through before he knows, and possibly wound the liver. There is usually no difficulty in finding the pylorus. It is recognisable in the normal condition by the appearance of a constriction over it, and the thickened ring-like feeling that it gives when grasped between the finger and thumb. These characters are usually made more distinct in stricture cases. If any difficulty should be met with in finding the pylorus with certainty, it is best to draw a portion of the stomach wall to the surface and follow the lesser curvature to it. Cicatrices on or near the pylorus confirm the diagnosis of stricture, so do the presence of adhesions. The absence of either gives negative information. A strictured pylorus is usually thickened, and this thickening can be felt as an addition to the normal resistance.

When found, the pylorus is drawn well forward into the abdominal opening, and all around it, boiled gauze wrung out of sterile normal saline is carefully packed into the abdominal cavity and over the parietal wound. If more than one piece of gauze is used, the nurse in charge of the sponges must keep account, and have the number of pieces as well as the sponges written down on a slate or a piece of paper for reference.

When the pylorus has been completely isolated, the stomach is opened 1½ in. above it. The easiest and safest way to make the opening is to pinch up a transverse fold (see Fig. 1), and give one side to an assistant to hold, whilst the operator himself holds the other, and to make the opening with scissors in the centre. A finger should then be introduced into the stomach, to examine the pylorus from the inside. In cases of great dilatation, the antrum pylori participates in the general enlargement, and forms a big pouch into which the finger readily passes. An operator not knowing this will sometimes lose valuable time in looking for the pylorus at the bottom of this cavity, when it is at the top.

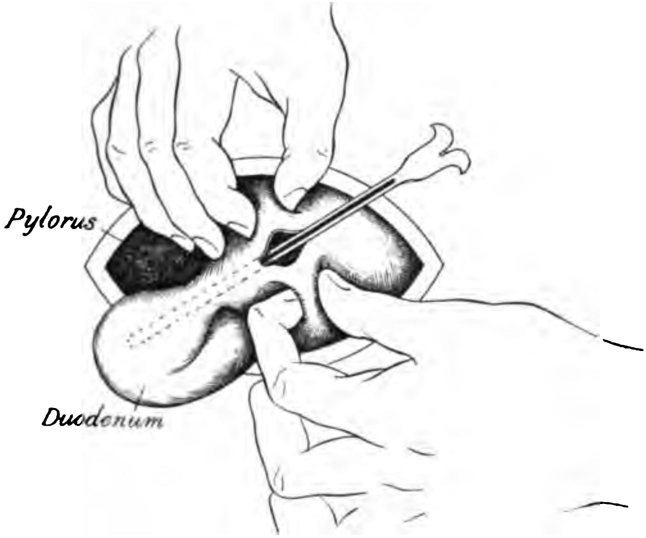

FIG. 1.

The lesser curvature of the stomach should be taken as the guide, and followed up to the pylorus. The stricture is next measured, and a guide is passed on through it into the duodenum. A large blunt director makes a good guide (see Fig. 2); and if this be kept as near the centre of the pylorus as possible, and projected against the anterior wall of the duodenum about an inch down, and the stomach wall, pylorus, and duodenum be slit up with scissors from the first opening to the point of the director, a proper and safe incision will have been made. The director must on no account be moved until the whole incision has been satisfactorily completed, for the exact position of the duodenum may be difficult to recognise, if definite landmarks are once lost. As soon as this part of the operation is satisfactorily completed, a threaded catgut

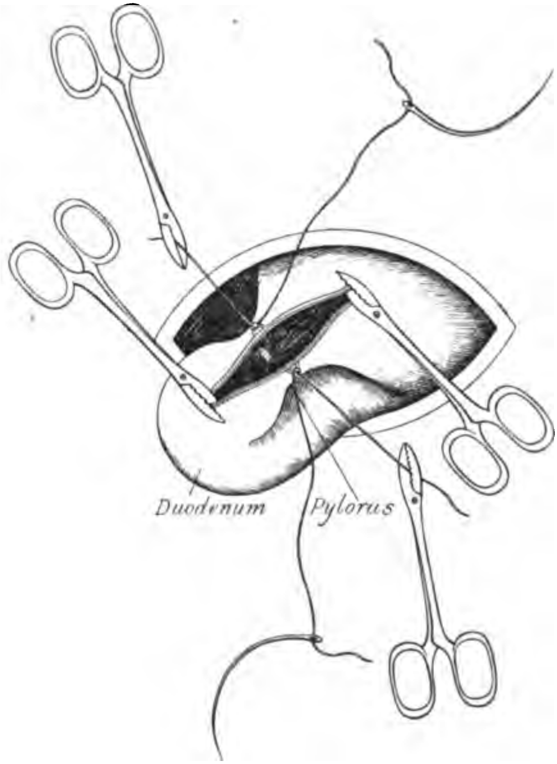

FIG. 2.

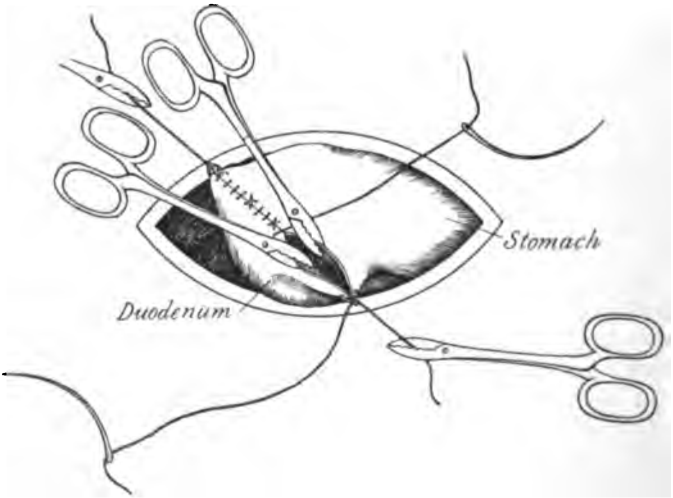

FIG. 3.

suture is passed through each divided surface of the pylorus, and the suture is tied with a long end which carries the needle, and a short end which is clamped in forceps (Fig. 3). By drawing the forceps apart, the longitudinal wound is converted into a transverse one, and is to be sutured in that position. The centre of the now transverse wound may be grasped with hæmostatic forceps on each side before commencing this suture. These serve as a useful guide until one-half of the first suture is complete. This first suture is of catgut, and the needles are Hagedorn's. It goes through all the coats of both stomach and duodenum, is continuous, and secures water-tight firm closure, and arrests all bleeding. For several years I have used this method of closing openings in the stomach and intestine, and would like to draw special attention to it as the most simple and satisfactory one. The suture, as will be seen by a reference to the figures, is not a simple overhand one. The first turn after the knot is looped, and this loop is put in every second or third turn after. The looping closes the angles well and prevents any puckering, such as is apt to occur with the ordinary continuous stitch. No trouble is taken to enfold any protruding mucous membrane, and the line of suture does not look very pretty. It is meant to serve only a temporary purpose and act solely, as previously stated. The first line of suture is buried by an interrupted one of fine silk Lembert sutures. (A continuous overhand suture should never be used for the purpose of securing permanent union, because of its interference with a proper blood supply.) The best

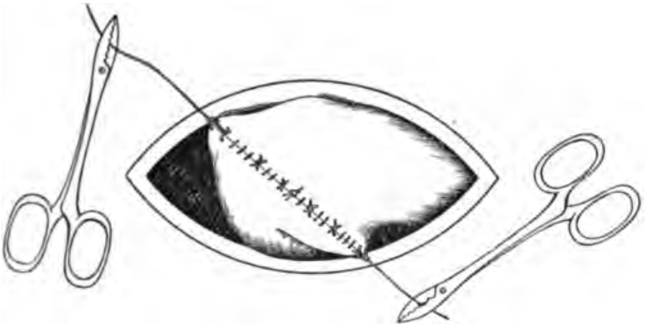

FIG. 4.—Catgut sutures complete.

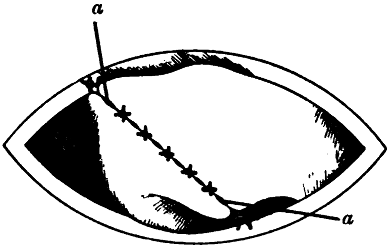

FIG. 5.—Lembert's sutures complete. (*a*) Temporary sutures to be cut off.

needle for this purpose that I know of is the intestinal needle made for me by Downs, London. The outer line of suture should be applied at and tuck in each angle first, leaving the centre portion to be dealt with last, and the aim should be to get the stomach, which is lax and thick-walled, drawn well down over the thinner duodenum. No further interference with the stomach is necessary. The dilatation soon gets well when its cause, the stricture, is removed. The simple operation described is in six cases out of ten that required, and any ordinarily careful surgeon who will perform it three times on the corpse, can do it in twenty minutes. Regarding the difficulties in diagnosis and operation met with, I shall say nothing at present. Most of them are described in the paper previously referred to.[1]

After-treatment.—This has nothing special about it. At the end of twelve hours, as in an ordinary abdominal case, small quantities of a mixture of equal parts of milk and barley-water may be given, and the doses of this are gradually increased during the next three days, when some thin arrowroot and milk may be added, and milk pudding at the end of the week. A 5-gr. dose of calomel on the third day, followed by a soap and water enema in eight hours, will move the bowels.

Recurrence of the stricture does not occur after this operation.

SOME RECENT APPLICATIONS OF BACTERIOLOGY TO CLINICAL MEDICINE.[2]

By EDWARD J. CAVE, M.D., M.R.C.P. (Lond.), *Physician to the Royal United Hospital at Bath.*

TWENTY years ago it was frequently noticed that our best students, after distinguishing themselves in medicine, when the time came for them to decide on their special course in the profession, turned aside from physic to what seemed the more attractive paths of surgery. This was the commencement of the Listerian era, and already enthusiasts in the art had foretold the practical abolition of sepsis. Results of treatment were already much more certain, and there was some sure ground for scientific forecasting of operative results. Medicine, on the other hand, seemed barren of promise. The causes of disease were vaguely discussed and guessed at, and our expectations of advance in therapeutics were in correlation with our ignorance on this head. We sought for new remedies among the products of organic chemistry on the lines of the old specifics, like mercury and quinine. Pathology, as taught to us, consisted of a mass of isolated observations in morbid anatomy, often minute and accurate as to the cellular changes and chemical alterations produced by disease, but concerned more with the results of morbid processes than with their causes and the conditions by which they might be modified. We were, for example, familiar with the vascular changes and cellular infiltration in inflammation, with the anatomical structure of tubercular masses and other granulomata, with the proliferative epithelial changes and cell infiltration in cancer, the swollen mesenteric glands and spleen in typhoid fever, the chemical deposition of the amyloid substance after prolonged suppuration, and a host of other seemingly disconnected phenomena.

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[1] *Lancet*, London, 26th February 1898.

[2] Read at the April meeting of the Bath and Bristol Branch of the British Medical Association.

But until the demonstration in one affection after another of the predominating part played by bacterial invasion of the body, and the reaction of the cellular elements of the body to this invasion in the processes of disease, there was no sufficiently established bond of union between these isolated appearances. They were like the dry bones in Ezekiel's valley, and when the hypothesis of the *contagium vivum* was widened and established by direct observation, it breathed a new life into the dry facts of morbid anatomy. One fact fitted with another, each bone joined unto his bone; and now, later, they are being clothed with flesh and sinews and skin in perfect keeping. Thus, while the fertilising influence upon surgery of the bacterial hypothesis, as affecting the septic infection of wounds, has, after full fruition, nearly exhausted itself, the influence of the same theory upon medicine is only beginning to be felt with its full force. And so I learn from the schools that in these last years the more promising of our students have been weaned back from their temporary wandering, and again betake themselves to the fruitful field of medicine proper, which has become so rich with promise. Each year adds to our already vast accumulation of facts in this domain, and each year serves to make clearer our conception of some of the intimate and essential processes of pathology.

When we come to apply our new knowledge in daily clinical practice, it becomes the duty of us all to avail ourselves of those methods whose value is sufficiently established, while it becomes increasingly difficult for those of us whose connection with the schools was severed before the new learning began, to keep ourselves abreast of the newer methods. When a new procedure is introduced, it is almost invariably in the first instance practised only by the few, by the experts and specialists in the particular branch to which it belongs. But when the value of a procedure is by this means established, then it can only achieve its full value and success by passing for daily use into the hands of all who practise our art. Thus, in the early days, the examination of sputum or exudations on the throat for various bacilli, particularly those of tubercle and diphtheria, were practised mainly by skilled pathologists, whereas now these are part of the routine duties of the clinical clerk. And I am convinced that the true relation of new facts observed by the pathologist in special departments to the general body of clinical observation, and hence the relative value of the newer observations and the weight that should be attached to them, in forming our opinion in a particular case, are most difficult to appreciate until the observations themselves have been divorced from specialism and made a part of clinical medicine.

I purpose to speak first of the examination of the blood. It is only two and a half years ago that the examination of the blood by bacteriological methods suddenly assumed a greater importance from the observations of Widal, Grünbaum, Durham, and others, on the clumping action of the serum of typhoid patients on emulsions of the specific bacilli of the disease. Within that relatively short time the great importance of this phenomenon has become universally recognised, its application to diagnosis is now in daily practice, and the conditions and limitations of the method are fairly definitely determined. It is so well known that I will not trouble you with any details, but merely quote my own experience of its value. In carrying it out I always practise two dilutions, 1 to 10 and 1 to 30, and often a weaker of 1 to 50. For a single dilution I consider 1 to 30 the most suitable. In thirty-two cases of typhoid fever I have never failed to get the reaction at some time in the course of the disease, generally early in the second week, often in the later days of the first week, sometimes not until the third week. In a relapse I have found it intensely developed on the second day. One case occurred in a pregnant woman, and ten months later I had an opportunity of testing her serum and that of her child, now 5 months old. The reaction was slightly marked in the serum of the mother (1 to 20), and quite absent in that of the child.

Excepting one or two cases of doubtful nature from which it is impossible to draw any inference, I have never obtained the reaction except in the presence of actual or recent typhoid fever. I regard it as of the utmost value in diagnosis. It is often present when the case first comes under observation, and enables us at once to express a positive opinion. In the obscure conditions so frequently confounded with typhoid fever in practice, such as acute tuberculosis, septic conditions and forms of influenza, it is of crucial value and importance. Even a negative result may have a conclusive significance when combined with a count of the blood corpuscles. It is well known that typhoid fever is one of the infective diseases in which leucocytosis does not occur; and a negative result as regards Widal's reaction of clumping, with an increase in the number of leucocytes in the peripheral circulation, may be held to exclude uncomplicated typhoid fever. There are several cases of this nature recorded in a paper by Mr. Churchill in the recently issued volume of *St. Barth. Hosp. Rep.*, and I have myself seen an instructive case in which pylephlebitis following on trouble in the appendix had led to an erroneous diagnosis, which was set right in this way.

The other method which I wish to speak of as regards the blood, is the examination of that fluid for living parasitic organisms. For many years it has been the practice to examine a drop or two of blood, obtained by pricking the skin, for the presence of organisms which swarm in the circulating fluid; and in the case of relapsing fever and malaria, and even in intense anthrax infection, this method is of practical value. But the presence of organisms that can be cultivated outside the body is much more certainly determined by the following method. Have ready an ordinary serum or hypodermic syringe of 10 c.c. capacity, with an asbestos piston, which has been thoroughly cleaned, sterilised by boiling, and wrapped in sterilised filter paper. Also three or more tubes of ordinary meat peptone agar. Most carefully sterilise the skin of the patient's elbow at the bend, select a vein made prominent by compression higher up the arm, and plunge the needle of the syringe through the skin and then into the vein, the needle pointing either upwards or downwards, as is most convenient. On gently withdrawing the piston it is quite easy to draw off 7 or 8 c.c. of blood without risk of extraneous contamination. This is immediately distributed over the surface of the tubes, which are then incubated at 37° C. If preferred, the medium in the tubes can be first liquefied and cooled to 40°, the blood added to the liquid agar, and the shaken mixture poured flat in a Petri's dish. By this means, which involves no danger to the patient, and is as painless as an ordinary hypodermic injection, it is possible to demonstrate the presence of bacteria in the blood in quite a number of infections. It is of service in cases of septic infection, such as ordinary traumatic surgical or puerperal septicæmia or osteomyelitis, and it often gives positive results in the later stages of pneumonia. But it is of pre-eminent value in the more obscure septic conditions which come under the notice of the physician, in cases, that is, of kryptic infection and in malignant endocarditis. In both these conditions I have been enabled to settle the diagnosis with absolute certainty in cases otherwise obscure. All physicians are familiar with cases of septicæmia in which even the post-mortem examination may fail to determine the point of inoculation; and if the lesions have not gone on to pyæmia, if none of the more conspicuous embolic phenomena nor endocarditis nor other localised septic inflammations have produced visible effects, the whole case may be an enigma. But in these virulent cases the bacteriological examination of the blood by the method described above will certainly elucidate the mystery. Even after death a satisfactory examination may be made. A length of a vein in a limb or other part remote from the normal habitat of bacteria may be isolated and ligatured, and removed to the laboratory for examination like a sealed test tube.

We recently had a fatal case in a man at the Royal United Hospital, under the care of my colleague, Dr. Bannatyne, in which this examination revealed a virulent staphylococcal infection, while no local signs of septic inflammation were discovered. The following case is also an instance:—

CASE 1.—Mary L., æt. 22, single, a domestic servant, was first seen by me on 18th March. She left her situation in January on account of dyspeptic symptoms, pain in the epigastrium, and vomiting, which latter was relieved by medicines and dieting. She never vomited blood. The pain persisted more or less, but she got much better, and intended taking a situation on the day before I saw her. Five days earlier, however, she began to suffer from severe headache, with shivering, and in the evening she took two pills obtained from a chemist (colocynth and blue pill). At midnight she vomited. At 4 A.M. she was purged, and the purging continued the whole of the next day, with occasional retching and vomiting. She also had a good deal of pain in her abdomen. Her appetite has failed. She has complained of great thirst, and her skin is said to have been cold and clammy. She had incontinence of urine on the 16th and 17th; not since. Her voice got very weak yesterday, while to-day she has complained of soreness in her throat. She has a short, dry cough. Temperature, 103°·4; respiration, 36; pulse, 138. Makes no complaint, but when asked says her throat feels sore. There is nothing amiss to be seen in the pharynx. Lethargic; lies on her back; speaks only in an almost inaudible whisper. Sordes on lips and teeth; lips cracked; tongue dry and brownish. Pupils large, active; fundus oculi normal. The thoracic organs appear normal, with the exception that subcrepitant râles are heard at both bases. There is no alteration of the percussion note. Some flatulent distension of abdomen. No signs of fluid effusion. Respiratory movement free. No expression of pain is elicited by pressure. There is no palpable enlargement of the spleen; nor are there any spots. Urine, sp. gr. 1020; clear, acid. A trace only of albumin. There are no wounds anywhere on the body; no swelling nor tenderness of joints; no discharge from either ear, and the membrana tympani is normal. She slept off and on in the night. The bowels acted once; the motion loose; dark yellowish brown; not flocculent. Temperature, 103°.

20th March.—Temperature, 103°·8; respiration, 40; pulse, 160. Very bad night, delirious and screaming. No vomiting. Bowels open four times; motions loose and lighter. Takes no nourishment. Is insensible this morning. Urine passed into the bed. A specimen of blood withdrawn from a vein yesterday gave no reaction with Widal's test, but sown upon agar it shows to-day several colonies of staphylococci (which on further growth were found to assume an orange colour, and to liquefy gelatin). She died at mid-day.

Post-mortem examination made the same evening.—Slight, right pleuritic adhesion. Lungs engorged, deeply so at the bases; otherwise nil. Heart rather soft; valves normal. Liver and gall bladder normal. Spleen not enlarged; soft. Kidneys together weighed 11 oz.; capsules stripped well; cortices pale; cones congested. Ureters and bladder nil. On the lesser curvature of the stomach was an ulcer, half an inch across, extending to the submucosa only, with slightly thickened edges. No affection of the peritoneum over it. Some reddening of the lining of the small intestines, especially on the valvulæ conniventes. Cæcum and appendix healthy. The uterus weighed 1 oz., and measured 3 in. Its cavity contained some blood and mucus, and there were small clots in the vagina. A recent corpus luteum in right ovary. No suppurative foci were found in the ears, nose, teeth, antrum, or other parts of the body. The brain and skull appeared normal. The spinal cord was not examined.

Numerous colonies of staphylococci were cultivated from the blood in the axillary vein. The source of infection was left quite uncertain. It may have been through the small ulcer in the stomach, or possibly through the uterus.

We have also had recently a remarkable series of five cases of acute infective endocarditis, in all of which the infecting organism was demonstrated by cultivation, either during life or immediately after death; and two cases in private practice showed in one case staphylococci; in the other, occurring six weeks after a miscarriage, streptococci. The three following cases will serve as illustrations:—

Case 2.—Alice W., æt. 21, single, a waitress, was admitted to the Royal United Hospital under my care, 17th January 1899. She had been ill for about two months, complaining of weakness, shortness of breath on exertion, and swelling in her legs and feet after standing all day. She had suffered pain in her knees and ankles. Has never had rheumatic fever, nor any illness worthy of mention. Menses scanty and pale, but regular. An anæmic girl. Complains of aching in her legs and feet. The legs are œdematous, the ankles rather tender. Temperature, 101°; respiration, 22; pulse, 85. Tongue has a thick white fur; salivary secretion acid. Lungs nil. Heart—apex-beat defined with difficulty, apparently in normal situation; area of dulness normal. A rough systolic bruit is audible at the apex, but louder and harsher over the third left costal cartilage; not conducted outwards and inaudible behind. The second pulmonary sound loud and sharp. Abdominal organs nil. No splenic enlargement. Urine, sp. gr. 1016; clear, acid; contains albumin ($\frac{1}{8}$). She took a mercurial purge, and a few doses of salicylate of sodium, with an alkali; but on the following day, having no pain, and the temperature falling to normal, she was ordered a tonic mixture of citrate of iron and ammonia, with arsenic and nux vomica. On the 20th her temperature again rose to 100°, and remained at the same level on the 21st, when she died quite suddenly and unexpectedly. At the post-mortem examination there were found large warty vegetations on the flaps of the mitral valve, with loss of substance. There were three small infarcts in the right kidney, and one in the left, the latter pale and partially decolorised. No other infarcts were discovered. In this case no examination of the blood was made during life, but in specimens taken with strict precautions from the heart and from the axillary vein a few hours after death, staphylococci were demonstrated in abundance by culture (*Staphylococcus pyogenes aureus*).

The next case was due to pneumococcal infection, demonstrated during life:—

Case 3.—Joseph M., æt. 47, a stableman, was admitted under my care on 17th January 1899. He came for treatment as an out-patient on account of general malaise, short breath, and swelling of his legs. He said he had not been in very good health lately, and had been drinking a good deal, but had had little to complain of until two or three days before admission. He only consented to become an in-patient after being allowed to go home and finish his work, and he was admitted the same afternoon after cleaning up his stable and washing two cabs. His temperature was 99°; respiration, 32; pulse, 96. His breathing very distressed. Face turgid and cyanosed. Cough troublesome. Some mucous expectoration, not bloody. Over the whole chest were heard loud, rattling, mucous râles, with sonorous wheezing. The heart sounds were difficult to make out owing to the rattling in the lungs, but there was thought to be a systolic murmur at the apex. No evidence of hypertrophy. The pulse fairly strong, with a distinctly thickened artery. There was some impairment of the stroke sound in the right subclavicular region. Liver, two finger-breadths below ribs. No enlargement of spleen. Legs very œdematous. Numerous petechial spots about the body, of larger diameter over the legs. He had very frequent diarrhœa, which was checked, after washing out the rectum, by a starch and opium enema. On the 18th his temperature was only 96°, but at mid-day had risen to 101°·6; respiration, 48. Pulse very quick and feeble. Towards evening his temperature rose to 104°. He was too ill for further examination, but blood withdrawn from a vein at the elbow gave several cultures of pneumococci. He died the next day.

Post-mortem.—The heart weighed 10½ oz. The aortic valve was stiff and thickened, and there was a large, red, friable vegetation, as big as a large green pea, on one flap; there was ulceration of the two remaining flaps where they came in contact with this. There was also ulceration on the auricular surface of the mitral segments, with projecting soft vegetations at the margin; adhesions of the right pleura, and a few ounces of fluid in each pleural cavity. The lungs much engorged, and the upper part of the right lung, though not absolutely airless, sank in water. Liver engorged. Spleen soft and slightly enlarged. The kidneys decidedly granular. No infarcts anywhere.

The next case was under the care of my colleague, Dr. Bannatyne, and I am indebted to him for permission to use the notes. These were taken in this and all the other hospital cases by Mr. W. H. Thorman, the resident medical officer. The case was one of streptococcal infection, demonstrated during life, and is interesting from the fact that no benefit followed the injection of the specific antistreptococcic serum.

Case 4.—Florence J., æt. 21; admitted 22nd February 1899. Had been in bed for a week, under the care of a physician who could detect no symptoms beyond malaise and sustained pyrexia. She had been ailing for a few days before taking to her bed, some ten or twelve days in all. A well-nourished girl; anæmic, with waxy pallor of skin; cheeks flushed;

lips dry and cracked; tongue furred. Temperature, 105°; respiration, 32; pulse, 130. No physical signs of disease in the lungs. Heart's apex *in situ*, of normal force. A soft systolic murmur is audible at the third left cartilage. There is some complaint of headache, mostly at the back of the head. No ocular paralysis; pupils of moderate size and active; fundus normal. There is slight abdominal tenderness; the parietes move freely in respiration. No spots. Liver dulness normal. Spleen perhaps slightly enlarged, the edge being doubtfully palpable. There are some irregular patches of cutaneous pigmentation in various parts. Urine, sp. gr. 1020, acid. A trace only of albumin. On the 23rd a cold pack reduced the temperature to 101°, but it rapidly rose again to 105°. So she remained for four or five days, the temperature line being remarkably level at 105°, and rapidly re-attaining to that point after being reduced by antipyretic treatment. The fæces and urine, after the 27th, were passed unconsciously, and on the 28th diarrhœa set in, with green watery stools. On 1st March there was noted some œdema of the legs. The respirations became very rapid, and the pulse running. Still no physical signs in the lung. A soft systolic murmur in pulmonary area. On the 3rd a number of small subcutaneous and cutaneous hæmorrhages appeared, with a larger one on the dorsum of each foot as big as a half-crown. She died the same evening. The blood was examined the day after admission. It caused no clumping of bacilli with Widal's test. Sown upon agar it gave rise later to numerous colonies of streptococci, and antistreptococcic serum was injected with no apparent result. There was a delay of a few days in discovering the streptococci in this case, owing to the fact that the blood taken at the bedside was immediately ejected from the syringe in considerable quantity into three agar tubes. Here it formed clot and serum; and the streptococci being entangled in the clot, no visible colonies were formed on the clear surface of the agar. They were only discovered on microscopic examination of the clot.

Post-mortem, there was vegetative ulceration of the mitral valve; also to a much less degree of the tricuspid. There were three or four infarcts in the kidneys, and one in the spleen. The lungs were engorged, especially at the bases. The central nervous organs we were not allowed to examine.

The organisms which have been found producing general septicæmia or infective endocarditis are the common staphylococci and streptococci, the pneumococcus, in cases observed by Thayer and others, the gonococcus, the *Micrococcus tetragenus* which is so often found in pulmonary vomicæ, the bacillus of Friedländer, the *Bacillus coli* and *B. pyocyaneus*. As regards other applications of bacteriology, I need only refer to the isolation by similar methods of the organisms of yellow fever and influenza, of the tubercle bacillus in rare cases of acute tuberculosis, difficult to demonstrate even by inoculation; of the *Micrococcus melitensis* by puncture of the spleen in Mediterranean fever, and the plague bacillus from the infected glands; of the bacillus of glanders, which seems to be more frequently present in the blood of infected men than in animals; and of the anærobic bacillus which Achalme, Thiroloix, and others claim to have isolated from the blood in some cases of acute rheumatism. The latter bacillus I have several times searched for and always in vain; while, as regards the detection of glanders, I would observe that clinically this is a matter of great difficulty, and that we cannot in man apply the mallein test, so valuable in the case of animals; the reaction in infected cases is far too intense and prolonged. But the demonstration of the bacilli and their peculiar cultural characters when grown upon potato are quite feasible and conclusive.

Another recent method that I have found of great value in some cases, is that commonly spoken of as the lumbar puncture of Quincke, first suggested by Quincke of Kiel some eight or nine years ago; but, so far, very little employed in this country. In connection with diseases of the nervous system, it is an obvious reflection that, apart from general constitutional symptoms of disease, our inferences are drawn solely from interference with the normal functions of the diseased parts; and our great advance in knowledge in recent years has been due to a corresponding increase in our knowledge of the localisation of function in the nervous tissues. In the case of disorder of most other deep-seated parts of the body, there is some secretion or product of disease which admits of direct examination by various methods, chemical, microscopical, bacteriological, and so on—for example, the sputa in diseases of the lung; the fluid effused in pleurisy, pericarditis, or peritonitis; the vomit, stools, urine, and so forth. All these often afford evidence of the nature of the morbid process, quite apart from the impaired natural function of the lung, kidney, or other part involved. And if, in the case of certain diseases of the central nervous system, an analogous change, directly dependent on the active morbid process, takes place in the cerebro-spinal fluid, and this fluid can be made available for direct examination, we see what an important addition is here made to our diagnostic resources, an addition quite unique as regards nervous diseases. At present we are concerned only with the bacteriological peculiarities of the fluid, and this seems to be the most important point to which we can direct attention. As a therapeutic agent for reducing pressure, most observers are agreed that the method is of little permanent value, and the rapid removal of a high pressure which has been established gradually, *e.g.* in the growth of a cerebral tumour, has been more than once followed by a fatal result. But, as practised for diagnostic purposes in the manner I will describe, the large experience of the continental, especially German physicians, seems to guarantee a safety which is practically absolute. I generally use an ordinary serum syringe, the same as for the abstraction of blood from a vein, and I prefer this to the bottle aspirator. The needle should be not less than 6 c.c. long, and 1 to 2 mm. in diameter. The object is to tap the spinal canal below the termination of the spinal cord, in the region of the cauda equina. The nerve-roots floating in the cerebro-spinal fluid will be pushed aside by the point of the needle and run no risk of puncture The syringe and patient's skin being carefully sterilised, as before, the patient lies on his side with the spine flexed and the knees drawn up on the abdomen. The needle is inserted either in the third or fourth lumbar interspace, or in the lumbo-sacral junction, as recommended by Chipault, and now more usually practised. It is inserted close beneath the spinous process, and in the adult a little to one side of the middle line, to avoid the dense interspinous ligament, and pushed slightly upwards and forwards along the under surface of the spine of the vertebra, for a depth in the adult of 5 or 6 cms. Gentle suction with the syringe will, as a rule, easily withdraw a few c.c. of fluid for examination. The fluid can be sown on agar, inoculated, or examined direct after centrifugalising. It is in cases of meningitis that this method is of most avail, but it has also given positive results in acute anterior poliomyelitis. In acute purulent meningitis, whether the so-called idiopathic form from pneumococcal infection, or the epidemic variety, or in cases secondary to disease of the petrous bone, it affords most valuable information.

A negative result must be allowed no weight whatever, and no inference as to the absence of disease can be deduced therefrom. For example, in purulent meningitis from ear disease, the free communication of fluid from skull cavity to spinal canal may be prevented, and a clear, sterile fluid withdrawn, but this is very exceptional. Lichtheim has laid down a rule, that no patient should be trephined for the cerebral complications of ear disease unless the probable absence of meningitis has been established by this method.

A positive result, demonstrating the presence of pyogenic organisms in the fluid, is conclusive of meninigits, though the inflammation may be of slight extent and to the naked eye entirely confined to the cerebral meninges. The following case exemplifies this, and at the same time the value of the method:—

Case 5.—Lizzie F., a serving-girl, æt. 15, was admitted to the Royal United Hospital on 4th December 1898. It was stated that she had been quite well until two days before admission, when she complained of general malaise, and some pain in her abdomen with the commencement of her period. The next day she became delirious, and her temperature was found to be 104° F. On the day of admission it rose to 105°. She was constantly delirious, talking at random, and recognising no one. Resisted examination. There was a systolic murmur at the base of the heart, but no other evidence of any disorder in the chest or abdominal organs. There was no optic neuritis. No sign of any local paralysis. One and a half pints of urine withdrawn by catheter contained albumin (½), some granular casts, and a few leucocytes. Pulse, 140; respiration, 32. Her symptoms remained practically the same. It was very difficult to get her to swallow. Her urine and motions were passed unconsciously, and she died comatose on the fourth day after admission, the sixth day of disease. Lumbar puncture was practised the day after she came in, and 3 c.c. of clear fluid withdrawn. From this grew two colonies only of *Staphylococcus pyogenes aureus*. At the post-mortem examination there were beaded vegetations on the auricular surface of the mitral valve, with definite ulceration in one part; the vegetations not visible from the ventricular aspect. The lungs were simply engorged; the liver swollen and opaque; the spleen weighed 10 oz., chocolate-coloured, soft almost to diffluence. No infarcts. The kidneys together weighed 12 oz. Slight tearing of cortex on stripping capsule. There were several infarcts, from the size of a small hazel-nut downwards. Two were almost decolorised and rather firm. Adrenals normal. The spinal cord and its membranes appeared quite healthy to the naked eye. In the brain was one infarct, ⅛ in. across, on the surface of the left hemisphere in the frontal region. There was a small quantity of recent lymph on the upper surface of the cerebellum and on the convexity of the cerebrum close to the longitudinal fissure. No tubercle. Numerous colonies of staphylococci were cultivated from the blood. The examination was made ten hours after death.

I may also quote as examples two other cases in which the puncture gave positive results.

Case 6.—On 3rd February I saw Mr. E., a healthy man, a free liver, æt. 36. He was taken ill four days previously with general malaise and pain in his head. On the second day he became delirious, but still complained of the pain in his head. For the past two days the delirium has been almost continuous, but he often puts both hands on his head and exclaims, "Oh! my head." When I saw him he was wildly delirious and paid no heed to questions asked. Restless, constantly throwing his arms about, and muttering to himself. Temperature, 104°; respiration, 32; pulse, 106. A foul whitish fur on tongue. No signs of disease in the lungs, heart, or abdominal organs. Urine, sp. gr. 1022; acid, and free from albumin or sugar.

The ears are healthy, and there has been no discharge. There is no record of any injury. The pupils are widely dilated, they contract slightly to light. There is no squint. No optic neuritis.

The knee-jerks are readily obtained, as also the plantar reflex. The legs are kept rather rigid and the knees cannot be straightened when he sits up in bed, but they can, momentarily, when he lies down. Lumbar puncture was practised, and 4 c.c. of turbid fluid readily withdrawn. This was ejected into a tube of sloped agar, which next day showed numerous clear transparent colonies of pneumococci. At night the temperature rose to 104°·6, and next morning to 105°·2. Respiration, 60; pulse, 140. He spent a very disturbed night, and in the morning became comatose, dying later in the day.

At the post-mortem examination there was purulent effusion over the whole cerebral dome, passing down towards the base; also on the surface of the fourth ventricle. Films stained by Gram's method showed numerous encapsuled, lanceolate diplococci, and further typical cultures were obtained. The spleen was enlarged and chocolate-coloured. The other organs appeared healthy. No attempt was made to obtain cultures from the blood.

In the following case, disease of the petrous bone gave rise to meningitis, and an abscess in the temporo-sphenoidal lobe, which burst into the descending cornu of the lateral ventricle.

Case 7.—Walter H., a cab-driver, æt. 19, came under my care on 2nd November. For years he had had a chronic discharge from his left ear, with deafness. He was in his ordinary health and at work on 25th October. Next morning he had a rigor, and complained of pain in the left side of his head. The pain has persisted since with great severity, and he has kept to his bed. He vomited once or twice yesterday and the day before. Yesterday he got drowsy, and talked nonsense most of the day when awake. He was delirious all last night.

Temperature, 101°; respiration, 26; pulse, 96. No signs of disease in chest or abdomen; no ocular or facial paralysis; pupils equal, of moderate size, contractile; no optic neuritis. Urine, 1028, acid; albumin ($\frac{1}{8}$). Lumbar puncture was performed, and streptococci found in the centrifugalised fluid; these were readily cultivated on agar. Next day his pulse fell to 80. Temperature, 102°; constantly delirious; head retracted; once complained of pain at the back of his head; vomited in the night. No optic neuritis and no paralysis of face or eye muscles.

At 8 P.M. his temperature rose to 105°. Pulse, 136. At 11 P.M. he became deeply comatose. Respiration, 10; pulse, 104°, regular. The respiratory movements slow, regular, sudden, jerky, and deep. Shortly after he died.

At the post-mortem there was purulent meningitis at the base of the brain. No sinus thrombosis. The dura mater was discoloured over the left petrous bone, raised from the bone and perforated. The perforation corresponded with an opening in the lower part of the temporo-sphenoidal lobe, leading into a large irregular abscess cavity containing very fœtid greenish pus. The abscess had opened posteriorly into the descending cornu of the lateral ventricle, and the lateral third and fourth ventricles contained a stinking sanious fluid, a considerable quantity in the lateral, slight in the fourth. The membrana tympani was perforated; the ossicles intact; pus in the superior mastoid cells corresponding to the perforation in the dura mater.

The organisms found are streptococci or staphylococci, as in the first and third of the preceding cases, but more commonly some variety of the pneumococcus of Fränkel and Talamon, either the pneumococcus proper, or a streptococcus closely akin, or the *Diplococcus intracellularis* of Weichselbaum, all of which Netter regards as varieties of the same organism. There is an admirable lecture on the subject by Netter,[1] containing an account of the application of this method to a small epidemic of meningitis that occurred in Paris early in the year.

In tubercular meningitis the difficulty of cultivating the organism direct from man to artificial media is so great, that the results are necessarily much less conclusive, but it is possible to demonstrate the presence of the *B. tuberculosis* by direct examination after centrifugalisation, in quite a large proportion of cases, varying with different observers from 20 or 30 up to 70 per cent. Fürbringer gives the latter percentage of positive results in over seventy cases, and Stadelmann the former. My own cases are not sufficiently numerous to compare with the large number of observations made by these physicians. I have been able to demonstrate the presence of the bacillus in three cases only. Here, of course, a negative result has no signification whatever.

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[1] *Semaine méd.*, Paris, June 29, 1898.

It is possible that other organisms which may be found to infect the central nervous system, *e.g.* the organism which the Italian observers, Memmo and Sanfelice, claim to have discovered and cultivated in rabies, may also admit of demonstration in this way, but I have not yet seen their original papers.

I submit, then, that the value of the three methods of diagnosis which I have referred to is now sufficiently established; and, while the first is in habitual and daily use, the two remaining methods, the bacteriological examination of considerable quantities of blood and of the cerebro-spinal fluid, are not appreciated at their full value nor practised as frequently as they deserve.

ACUTE RHEUMATOID ARTHRITIS.

By R. A. Bayliss, M.R.C.S. (Eng.), L.R.C.P. (Lond.), *late Resident Medical Officer to the Royal Mineral Water Hospital, Bath.*

At the outset it will be well to state that the class of case which, for want of a better name, at present may be defined by the term acute rheumatoid arthritis, is totally distinct from the apparently similar but more chronic form, not only with regard to its symptoms and progress, but possibly also from an etiological and pathological point of view. Its frequent occurrence at an early period of life, its rapid progress associated with increasing debility, form a striking contrast to the chronic variety, with its slow development and little if any constitutional disturbance.

The large majority of cases of acute rheumatoid arthritis occur in females, though occasionally males may be affected by it. The age of the patients varies within somewhat wide limits; children of even 4 years of age having been seen, presenting all the typical signs of the disease, whilst, on the other hand, the onset may be delayed till the individual has reached 45 years and upwards. The cases occurring in early childhood are, as a rule, amongst girls.

The causes producing the disease are still, to a great extent, matters for conjecture and speculation. It cannot be gainsaid, however, that climatic conditions form a prominent factor in the production of this malady; residence in a damp locality, or in the vicinity of stagnant water, or on marshy ground, being the only assignable reason in many cases. It may follow on some other acute affection, such as one of the exanthemata, or even after childbirth, but their influence is probably only of an exciting kind in an individual already prone to the disease. More recently, Drs. Bannaytne and Wohlmann have attributed the origin of rheumatoid arthritis to the invasion of the system by a distinctive and characteristic bacillus, which they found in the fluid obtained from the joints, but further elucidation on this point seems necessary before it can be finally accepted.

In some cases the patient gives the history of having had acute rheumatism a few months previously, since when the joints have never resumed their normal condition, and have been gradually getting more stiff and swollen. It is, however, a point for determination whether this previous affection was of a purely rheumatic kind, or whether it was simply the commencement of the rheumatoid condition.

Generally speaking, acute rheumatoid arthritis begins in an insidious way, the fingers of one hand very frequently becoming enlarged and stiff. The patient, as a rule, takes but little notice of it until he finds his other hand affected, when the consequent loss of power prevents him from following his usual calling. The other joints soon become affected in rapid succession; the ankles, knees, wrists, and elbows, being the most prominent ones disabled at first; whilst later on the hips, shoulders, and articulations of the jaw and neck are very frequently implicated.

The appearance of a typical case at this period of the disease, which may be reached in only a few months, is painfully characteristic of the complaint. The patient has a careworn expression, with often a slight localised pink flush on the cheeks. Anæmia is present in a variable degree, as likewise general wasting. The joints present an appearance which, at any rate in the advanced stages, is quite unmistakable, and even in the early weeks of the disease is ominously significant.

The deformity of the hands is perhaps one of the most peculiar features of the malady. The phalangeal joints are swollen in a fusiform manner, and the joint cavities often contain fluid which, by the increased tension, causes pouch-like protrusions to be formed around them. There is well-marked wasting of the muscles of the back of the hand and forearm, which in the former position produces a curious scooped-out appearance, as it were. The whole hand is, as a rule, deflected to the ulnar side, which together with the flexion of the fingers (due to the more or less unopposed action of the flexor muscles) combine to give rise to much distortion. The wrists, too, may be enlarged, and not at all unfrequently completely ankylosed. The elbows, shoulders, and ankles are also in their turn affected. The knees are most commonly implicated, and often present a considerable amount of swelling, which sometimes is due to the presence of free fluid in the joint, though more frequently to thickening of the synovial membrane and peri-articular tissues. The muscles of the calf and other parts of the lower limbs are atrophied to a degree which is sometimes almost incredible, and the feet may be flat, from the giving way of the various structures supporting their arches.

Profuse sweating of the hands and feet may be observed now and again, whilst occasionally the fingers have a bluish appearance, and are cold and clammy to the touch. Pigmentary deposits are present sometimes on the back of the hands and forearms, but their connection with the disease is somewhat problematical. In a number of cases the glands in the neck, axillæ, and groins are enlarged, hard, and tender, though the spleen is unaffected, as far as can be ascertained by palpation and percussion.

The gastro-intestinal tract is as a rule more or less deranged; dyspeptic symptoms, with furred tongue and troublesome constipation, being commonly met with in the course of the malady.

The temperature in quite a large majority of the worst cases is of the hectic type, reaching from 100° to 102°, or more at night.

The progress of acute rheumatoid arthritis is interesting, though, as most of the hospital patients after being discharged drift out of sight, their ultimate fate cannot be definitely ascertained. It is certain, however, that under suitable treatment a fair number greatly improve, and maintain their ground for years, eventually dying of some intercurrent malady; whilst others rapidly succumb under the influence of one or more of the many complications so apt to arise in the course of the disease.

The chief complications are endo- and pericarditis, pleurisy with often rapid effusion; and in one case the patient, though in hospital and carefully dieted, had a sharp attack of appendicitis. It is a moot point whether primary endocarditis can occur in acute rheumatoid arthritis, but in many cases there has been distinct evidence of a valvular lesion without any previous history of acute rheumatism.

Peripheral neuritis may here be mentioned as occasionally occurring in the later stages, doubtless due to the extension of the morbid process to the nerve-trunks.

The pathology of this truly terrible malady is still to a very great extent shrouded in mystery. It is held by some, that it is due to a primary lesion of the spinal cord, the joint affection, muscular atrophy, and other trophic anomalies being secondary to it. This theory, however, seems hardly to explain all the symptoms, and in only a very few fatal cases has any definite abnormality been discovered in the central nervous system.

Other writers consider it to be a secondary form of rheumatism;

but it must be admitted that, compared to the acute form of rheumatoid arthritis which we are now discussing, there is very little similarity. Reference has been previously made to the bacteriological view of the malady.

What, then, is the best explanation to account for all the chain of symptoms detailed above? I think there can be no doubt that it is a general disease of the system and not a localised affection of the joints, the various manifestations of the malady being due to the blood dyscrasia. What, however, gives rise to this altered condition of the blood still requires to be discovered.

The pathological anatomy of acute rheumatoid arthritis centres naturally round the most prominent parts affected, namely, the joints. On examining a joint post-mortem, the peri-articular tissues are thickened, and the synovial membrane has lost its shiny character, and has oftentimes developed fringes. The cartilages are eroded, bare bone being in places exposed, whilst here and there signs of commencing proliferation may be seen on their surfaces. The joint cavity sometimes contains fluid of a more or less turbid character. The body generally presents all the signs of wasting disease, there being considerable atrophy of the muscles and but little fat.

The treatment of acute rheumatoid arthritis is not quite so hopeless as one would imagine from the foregoing, though, of course, an absolute cure is out of the question. A great deal, however, can be done by judicious and persevering measures to improve the condition of the sufferer. The surroundings of the patient should in every way be of the best possible kind, residence in a dry climate being an absolute *sine quâ non*. It is important, too, that the patient's clothes should be of some woollen material. The diet should be plain but nourishing, and all rich dishes or sauces must be entirely eschewed. Some stimulant, preferably whisky, may be taken with advantage, especially if it seems to improve digestion.

If there is much elevation of temperature, the patient should, of course, be confined to bed, though it is desirable that he should sit up for a short time daily, as matters improve, to prevent the joints from becoming stiff.

Many drugs have from time to time been brought forward as more or less efficacious in the treatment of acute rheumatoid arthritis, the chief of which are carbonate of guaiacol, salol, salophen, β-naphthol, and benzosol. I think, on the whole, guaiacol carbonate gives the best results, and it may very conveniently be combined with the saccharated carbonate of iron, where much anæmia and debility exists. Cod-liver oil, maltine, and petroleum emulsion are all exceedingly useful when there is much loss of flesh and wasting. Any irregularities of the digestive organs should be attended to, and appetite may be promoted by the administration of some dilute mineral acid along with strychnine.

The local treatment is by no means the least important. Thermal baths, which can be obtained (chiefly in this country) at Bath, Buxton, or Harrogate, or at the numerous continental spas, give great relief to the sufferer, render the joints more supple, and by promoting the action of the skin aid the elimination of the morbid products. The mineral waters may also be taken internally, producing a beneficial flushing action on the system. The adjuncts to all good bathing establishments, namely, hot and cold douches for all parts of the body, aix-massage, vapour baths, and hot-air baths, are all in their turn useful in restoring to the joints some of their lost mobility. Dry massage may with advantage be practised on the day alternate to that on which the bath is taken.

Several medicaments applied locally to the joints have been tried, with a view to relieving pain, and causing, to some extent, the absorption of the adventitious tissues. Passing over the older remedies, such as glycerin and belladonna and iodine, which in their way are useful, we come to two drugs which are worth consideration, namely, guaiacol oil and salicylate of methyl. They are both used diluted with one or more parts of olive-oil, and painted on the skin over the affected joint. Gutta-percha tissue is then applied, and round this a layer of cotton-wool, the whole being held in place by a bandage. Guaiacol certainly relieves pain, reduces temperature, and under its continued application the swelling often diminishes. As a local anodyne, methyl salicylate is undoubtedly superior, though it is questionable whether its results are so far-reaching, as those obtained by the use of the guaiacol.

If the joint is acutely inflamed, a hot dressing of boric acid lotion, frequently applied, is very comforting to the patient.

Aspiration of a joint considerably distended with fluid, pressure being applied afterwards, is sometimes a useful procedure, but extreme care should be taken to perform the operation with the strictest antiseptic precautions, otherwise mischief of a very disastrous kind may be set up.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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A System of Medicine by Many Writers. Edited by THOMAS CLIFFORD ALLBUTT, M.D., LL.D., etc. Vol. VI. London: Macmillan & Co., Ltd. 1899.

THE change that is taking place at the present time in the methods and mental attitude of the scientific physician is forcibly brought before the mind of the reader of Professor Clifford Allbutt's "System." If, after the study of one of the more important articles in this volume, he takes up a first-class work of twenty years ago, such for example as Ziemssen's "Cyclopædia," and reads the corresponding article, it becomes evident, not only that many new data have been obtained during this lapse of time, but that the point of view has changed, and changed in general for the better. If, further, the reader goes back another twenty years, and looks up the subject in Aitken's "Science and Practice of Medicine," or, still more markedly, if, reverting to a standard work of the beginning of the century, he seeks information on the topic in question in such a work as Mason Good's "Study of Medicine," it will seem to him as though medical science is being reconstructed from its very foundations. As he looks back, it will appear as though the experimental method and the adoption of minute and accurate observation have been a continually increasing quantity in the perspective; while mere speculation, vague hearsay evidence, and empiricism are shrinking and disappearing decade by decade. It is highly gratifying to note the change, and to picture to oneself the further curve of this rapidly ascending arc of progress in the scientific methods of medicine, which, if it continue in its present ratio, augurs favourably for the welfare of mankind, and promises a fulfilment of the ancient prophecy of the Delphic sibyl, "Thou, O Asklepios, art born to become one day a great solace to the world." At no period of history have so vast a number of trained workers in all countries devoted themselves to seek the bed-rock of fact, and to explain the complex and intricate problems which confront the physician. The domain of medicine proper becomes so wide, that no one mind can embrace it. Only by division and subdivision of labour can it be either investigated or presented to the student. Hence the need for the collaboration of many writers in a comprehensive "System" like that we are considering. It may be remarked, in passing, that in a work like this, comprising much detail, it is important that in each article clearness of classification should keep pace with amplification of matter. Where many writers are engaged, it is difficult to insure a system of arrangement so lucid and uniform that the busy practitioner may readily find the information he seeks on any particular point. It cannot be said that there is much to criticise from this point of view in this sixth volume, which indeed maintains the high standard of excellence of the earlier portions. Sir R. Douglas Powell's paper on angina gives a clear account of and distinction between Nothnagel's vasomotor angina and the true cardiac form, in addition to much other matter of pathological and therapeutic interest. Dr. Frederick Roberts follows with an account of mediastinal disease and intrathoracic new growths. The full and exhaustive detail of symptoms and diagnosis given by him form, perhaps, the most complete exposition of the subject the present writer is acquainted with. The succeeding papers on thrombus and embolism, by Professor Welch of Baltimore, are highly interesting; he enters deeply into the pathology of thrombus formation, and gives an account of paradoxical or crossed embolism—the passage of an embolus through an open foramen ovale from the venous to the arterial side. Patency of foramen ovale is very common, and if venous thrombosis cause engorgement of the right side, as it often does, one can readily conceive that, during moments when negative pressure exists in the left cavities, a particle of clot might be sucked through and form a dangerous embolus within the arterial system. Good papers by Mr. Clutton on phlebitis and by Dr. Mott on arterial degeneration succeed. Then follows a treatise on aneurysm of the thoracic aorta, to which the lengthy experience of Sir William Gairdner gives great value; the important question of etiology, and the influence of strain and overwork, as pointed out by Professor Clifford Allbutt, are considered. Short papers by Dr. Rolleston follow, on abdominal aneurysms and on disease of lymphatic vessels, also other short notices of some of the rare forms of disease of muscle, such as mytonia, by various authors. As a general preface to trophoneuroses and nerve diseases, Dr. Bevan Lewis contributes a paper on the general pathology of the division, including inflammation and the degenerations. Then follows a statement of the physiological aspects of tremor, tendon phenomenon, and spasm, by Professor Sherrington of Liverpool; also the clinical and pathological sides of the same by Dr. Seymour Sharkey, whereby the whole subject is made plain and clear. The trophoneuroses comprise neurotrophic affections of bones, joints, and soft tissues, Raynaud's disease, erythromelalgia, and that strange and rare aliment, adiposis dolorosa. Dr. Barlow describes the paroxysmal character of Raynaud's disease, and the attacks of heat, redness, and pain, which often alternate with the local syncope and asphyxia; the impairment of sensibility; the exacerbations in cold weather, and the association with hæmoglobinuria, in the discovery of which Dr. Barlow himself had so important a place. He concludes with remarks on the value of the constant current as a means of treatment.

After an interesting introduction, historical and pathological, Drs. Gibson and Fleming give a well classified, careful, and detailed account of the various diseases of the spinal nerves. In the field of therapeutics the present writer observed with much satisfaction how fully the two authors recognise the value of counter-irritation by small blisters, and otherwise,—a point too often forgotten.

In the next article, Dr. Judson Bury gives a full account of multiple symmetrical peripheral neuritis.

Time and space forbid reference to Dr. Head's excellent account of trigeminal neuralgia, also to the interesting subject of the morbid states of the cranial nerves dealt with by Dr. Aldren Turner.

Articles on medical ophthalmology by Dr. Brudenell Carter, on diseases of vertebral column, etc., by Mr. Victor Horsley, and on affections of spinal meninges, by Dr. Risien Russell, conclude the volume.

RICHARD CATON.

Laboratory Work in Bacteriology. By FREDERICK G. NOVY, Sc.D., M.D., Junior Professor of Hygiene and Physiological Chemistry, University of Michigan. Second Edition. Ann Arbor: George Wahr. 1899.

THIS book is intended in the first place for the use of students at work in the author's own laboratory. It gives a full programme of practical work on typical bacteria, with notes on the methods employed. Considerable space is given also to the discussion of general questions of the morphology and physiology of bacteria. The book, however, does not take the place of a general text-book. For each part of the work one method is given, and no attempt is made to describe other suitable methods, even though they may be in common use. While this limitation exists, it must at the same time be granted that the methods recommended are eminently suitable for class teaching. The general descriptions also are written in a very clear and interesting manner; consequently the book will be a great aid to those teachers who make the course described in it the basis of their practical teaching. The plan has been adopted of leaving blank pages, to encourage students to make their own drawings and observations. For an ideal course in practical bacteriology there is required a larger amount of actual contact with bacteriological problems than is given here. Students should be familiarised with the identification and isolation of bacteria, from their natural habitats. Again, to medical students, it is important to be familiar with the way in which bacteria are distributed in pathological tissues; and in observations on this also there is not sufficient practice. This defect, however, is due to the conditions under which the subject is taught in the University of Michigan. This course is given to students in the first or second year of their curriculum. In medical schools in the United Kingdom it is customary, on the other hand, to teach the science to advanced and post-graduate students who are already familiar with pathological and histological methods. To teach the subject earlier in the curriculum results in its being cast in the dogmatic form which is adopted by the author. The facts of bacteriology are as yet often incapable of being so treated. It seems wiser, therefore, to defer the teaching of bacteriology till the student's powers are sufficiently mature to permit of his being taught the science through its application to actual pathological and hygienic problems. In this way he will naturally learn the variability of bacteriological methods, and the tentative character of many of its conclusions.

J. LORRAIN SMITH.

Manual of Bacteriology. By ROBERT MUIR, M.D., Professor of Pathology in the University of Glasgow; and JAMES RITCHIE, M.D., Lecturer in Pathology in the University of Oxford. Second Edition. Edinburgh and London: Young J. Pentland. 1899.

WHEN the first edition of this work appeared in 1897, we prophesied for it a successful and useful existence, and from the fact that a new edition has appeared in less than two years, it will be gathered that this prophecy was by no means incorrect. The general plan of the book remains much what it was, but in detail and in fulness of information the scope of the work has been very considerably extended. This has been done, however, without unduly increasing the size of the volume, and we notice that several very judicious excisions have been made, which have allowed of the introduction of new matter without overburdening the work. The new illustrations are good and useful; and, without in any way detracting from the value of the first edition, we may say that the second edition is a considerable improvement on the first. Indeed, the authors may congratulate themselves that theirs is still the best book on pathological bacteriology in the hands of the student. G. SIMS WOODHEAD.

A Class-Book of (Elementary) Practical Physiology. By DE BURGH BIRCH, M.D. London: J. & A. Churchill. 1899.

THIS little book has been compiled by the author from the notes which he has been in the habit of giving to students attending the ordinary course of practical physiology in the Yorkshire College, Leeds. It thus includes histology, physiological chemistry, and experimental physiology; and as the volume only runs to about 270 pages, the author must have experienced very often great difficulty in selecting and cutting down his material. There can be no doubt that the little volume is essentially practical, and that it gives a good outline of the useful work which students in the Yorkshire College physiological department are required to carry out. The histological section occupies the largest part of the book. It gives a short account of the usual methods employed for the preparation of tissues for examination, and a rather too brief description of the appearances presented by the sections on examination with the low and high powers. It is unfortunate that a fairly large number of printer's errors have escaped correction, only it is not necessary to refer to them here, as any reader can easily correct them. It may occur to some that it would have been better if the descriptions of the sections had been rather more elaborate, even at the expense of making the book decidedly larger. As it is, some of the descriptions are much too short, as, for example, those on small intestine, lymph gland, spleen, etc. The section on physiological chemistry is good, although rather short. The last part of the book, dealing with experimental physiology, is undoubtedly the best. It is clearly and concisely written, and gives sufficient directions to allow the student to carry out his own experiments. The method which the author describes to show the effect of heat and cold on the character of muscular contractions is a very good one. T. H. MILROY.

Die Krankheiten der Mundhöhle, des Rachens und des Kehlkopfes, für praktische Aertze und Studirende. Von Dr. ALBERT ROSENBERG, in Berlin. Second Edition, revised and enlarged. Berlin: S. Karger. 1899.

THE success which attended the issue of the first edition of this work, and the various additions which from time to time have been made to our knowledge of the pathology and treatment of the affections of the mouth, pharynx, and larynx, have rendered a second edition necessary. We cordially endorse the author's own wish that it may receive the same hearty approval which was bestowed upon the previous publication. Dr. Rosenberg writes with authority; his experience in this special branch of medicine and surgery is a large one, and is based upon many years of clinical work in the University clinique superintended by Professor B. Fränkel. All scientific work should be written in a clear and concise manner, so that the author's meaning may at once become evident to the reader. Dr. Rosenberg's descriptions fulfil this desideratum, and to the English reader the text is easy, thus affording additional evidence of the clearness of his style. One turns with some interest to read the writer's views upon Kirstein's autoscopy of the larynx, because this method of examination was first brought under the notice of the profession in Berlin. Its results are summed up in a few lines. Autoscopy is practicable in about one-third of the cases; it is occasionally made use of for the purpose of inspecting the posterior laryngeal wall, or even for operative measures upon the same; also for the examination of, but in particular for endo-laryngeal operations upon, young children. The direct bronchoscopy of Killian is not referred to, but presumably it hardly comes within the scope of this work. It is a matter both for regret and of surprise that an erroneous statement concerning the innervation of the muscles of the soft palate should still find its way into the revised edition of an authoritative text-book. It is stated that in facial paralysis, paresis of the soft palate occurs if the nerve lesion is situated above the geniculate ganglion; to such a statement as this, exception must certainly be taken. In conclusion, we must congratulate Dr. Rosenberg upon the clear and succinct style in which he deals with his subject, and at the same time express our approval of the manner in which the volume is printed and illustrated.

A. LOGAN TURNER.

The Serum Diagnosis of Disease. By RICHARD C. CABOT, M.D. London: Longmans, Green, & Co. 1899.

THE object of the author in this volume is to set before his readers the present state of our knowledge regarding serum diagnosis. While he modestly puts it forward as a compilation, we must credit him with the orderliness of the arrangement under which his facts are marshalled, and with the clear way in which the various points are put. The first part of the book is devoted to methods, and here, as is natural, the illustrations are chiefly drawn from experience in the serum diagnosis of typhoid fever. The various methods in vogue are discussed, the general conclusion being that that method is best with which each worker is most familiar. While this is undoubtedly true, it suggests that we are still incompletely informed as to what are the essential factors to be taken into account in all methods. *Inter alia* here, Dr. Cabot advocates the reliability of diagnosis founded on the result of 1 to 10 dilution observed for fifteen minutes, a statement which appears to us, in face of recent results, not to be sufficiently substantiated. In the second part of the book the results of the application of serum diagnosis to typhoid fever, and the various questions relating to its occurrence and significance in this disease, are discussed. We are glad to find the author upholding the value of the method, as especially in this country there has of late been a tendency to unduly magnify negative instances. Some facts are given regarding serum diagnosis in atypical forms of typhoid and in allied affections which are of the highest interest in relation to the scientific principles which underlie agglutination. The third part of the book deals with the serum diagnosis of diseases other than typhoid. After reading it, we feel how much still must be done before such diagnoses can be looked on as reliable, but the outlook in this direction is of course distinctly hopeful. The book as a whole may be recommended to those who wish a general view of the subject, and who have not the opportunity of consulting original authorities. In certain parts it somewhat lacks perspective, for in no subject more than that with which this volume deals is it true that the wide experience of the few is of infinitely greater importance than the limited experiences of the many. JAMES RITCHIE.

A Short Practice of Midwifery. By HENRY JELLETT, M.D. Second edition. London: J. & A. Churchill. 1899.

THAT a second edition of this little handbook should so early appear is ample proof of its excellence. The arrangement of the order of the subjects discussed is an improvement on the former edition. Embracing as it does the practice and teaching of the Dublin school, it is particularly interesting to us in Edinburgh, in so far as it differs so widely on certain important questions. In this relation particular attention may be directed to the indications for the use of forceps; at the Rotunda they are applied in about 3 per cent. of cases only. Comment is needless! The management of concealed accidental hæmorrhage by vaginal plugging is novel and startling. Such expectant treatment in a case where, before symptoms have shown themselves, severe internal hæmorrhage must already have occurred, must require more than ordinary force of character to adopt.

The general facts are clearly and succinctly put, with a total avoidance of unnecessary padding; indeed, in some places a fuller description of management seems desirable, as, for instance, in the treatment of gravid retroversion, where, although catheterisation is recommended to be done in the knee-elbow position, this valuable posture in the actual reposition of the uterus is not mentioned. Perhaps the best chapter in the book is the description and management of the third stage of labour. On the other hand, that on extra-uterine gestation is indifferent, the classification is involved and difficult to follow, while no mention is made of the commonest variety of intraperitoneal hæmorrhage, *i.e.*, through the patent abdominal ostium of the Fallopian tube.

One deplores the total want of recognition of the time-honoured classification of the various positions of the presenting part, which naturally must be severe on the Rotunda-taught student, if examined in other schools, and argues the necessity of a generally accepted classification and nomenclature to be adopted by all teaching bodies. In this respect the definition of the first stage of labour as stated, namely, "till full dilatation of the os and rupture of the membranes," is unacceptable by many teachers; tough unruptured membranes being mostly considered a cause of delay in the second stage of labour, not in the first.

The author is heartily to be congratulated on the all-round excellence of the handbook, and we heartily hope, as we fully expect, that the need of a third edition will as soon occur as that of the present.

F. W. N. HAULTAIN.

Methods of Staining the Nervous System. By Dr. BERNARD POLLACK. Translated from the Second German Edition by WILLIAM R. JACK, M.D., B.Sc. Glasgow: F. Bauermeister. 1899.

A BOOK which treats of fixing tissues and staining methods generally covers far too extensive a field to permit of the personal experience of the author embracing anything like the ground covered. The volume under review is limited to the nervous system, and consequently we may anticipate a brief commendation of methods found by experience to be good, or a word of caution where waste of time with ultimate failure are probable if not inevitable. The necessity for such advice is readily understood. A laboratory worker finds out, after some months of experiment, a new method for staining a special tissue, and flies to record the idea before anyone else can anticipate him. As likely as not he is found to have greatly modified the method in a few weeks' time, if not cast it aside altogether. It only needs a month's work wasted to make this a very real cause of complaint, such as the writer experienced some years ago.

Pollack in writing an admirable book is not quite beyond reproach on this score, and repeatedly reference is made to a method as being stated to be an improvement, leaving the reader in doubt as to whether the author had really tested the formula described or not. Would it not be more satisfactory if a book on methods were written by many neurological workers who actually wrote of what they knew by experience? If it is necessary to make these few derogatory remarks, it should also be admitted that in many respects the volume is a step in advance of even the very excellent work by Goodall. It gives a useful conception of the most recent methods required by modern neurologists, and the best fixing and staining reagents for each portion of the nervous system, while care is taken that the essential details are given clearly and succinctly. The pioneer labours of Golgi, Nissl, Weigert, and others are fully described in their proper place, and the greatest pains has been taken to insure orderly arrangement of subject-matter. The section on the staining of nerve-cells deserves special praise. Dr. Jack has done what is generally a rather thankless task most efficiently, and there is no doubt that the success he merits should mean an early call for a second edition of the book in English.

ROBERT A. FLEMING.

Atlas of Syphilis and the Venereal Diseases. By Professor Dr. Franz Mracek. Edited by L. Bolton Bangs. London: The Rebman Publishing Company. 1898.

In a series of seventy-one coloured plates most of the syphilitic lesions are well illustrated. This applies especially to the skin and mucous membranes, since the diseases of bones, muscles, and joints are omitted. It would be difficult to praise too highly the coloured drawings of the various forms of secondary eruptions and tertiary gummatous lesions. A good account is given of each case from which the drawings were made, and at the end is appended a short treatise (of a hundred pages) on syphilis and other venereal diseases. The treatment advocated differs much from that in general use in this country, since mercurial inunctions alone are employed in nearly all cases, to be kept up "until the symptoms have disappeared, and after that for a period equal to one-third or one-half of the time occupied by the original treatment." In most cases twenty or thirty inunctions are supposed to be sufficient. The use of mercury given internally is not advised.

It is a striking commentary on this teaching, to find the author stating "that there are no objections to repeating the treatment for every one of the many relapses which usually mark the course of a syphilitic disease." When appropriate doses are begun early, and continued for twelve or eighteen months, relapses during or after the treatment are exceptional.

The translation has not been made with sufficient care: thus a hypodermic injection is advised, consisting of 8 grs. of bichloride of mercury, dissolved in 2½ drms. of water; and one is directed to inject "one syringeful of this solution at intervals of a week." From this the reader might easily be led to inject enough corrosive sublimate to cause a rapidly fatal result.

The term used throughout for a venereal ulcer, "a sclerosis," is not a happy one; and the treatment advocated for gonorrhœa is behind the times, since astringent injections are forbidden until the end of the second week, when, with early and proper treatment, most cases should no longer require them. Nevertheless, the excellence of the illustrations leads us strongly to recommend this work to students and practitioners.

J. Hutchinson, Jr.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF

A. LOCKHART GILLESPIE, M.D., F.R.C.P.Ed.,
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SCARLET FEVER.

McCOLLOM (*Boston City Hospital Reports*, 1899) discusses the influence and significance of the numbers, the mortality, the accuracy in diagnosis, and the clinical characters of or relating to scarlatina, upon the health returns of Boston, U.S.A. The first point he draws attention to is the marked diminution in the ratio of deaths to population in Boston caused by scarlet fever within the last few years, although the figures for the last seven or eight years are higher than the abnormally low rate observed in 1889. In that year the deaths from scarlet fever were only 0·53 per 10,000 of the population, contrasting vividly with the maximum of 26·04 observed within the last fifty-eight years. In 1892 the same ratio was 5·8, since when it has persistently diminished down to 0·61 in 1898. Quite as striking are the figures showing the rate per 10,000 of cases of the fever. In 1892, 68·87; in 1895, 52·11; in 1898 they only reached 16·77 per 10,000 inhabitants per annum. Although Boston could show so good a result, comparison with the rates obtaining in other large American cities demonstrated that Boston throughout possessed an unenviable pre-eminence, Philadelphia, Brooklyn, Chicago, St. Louis, and, save for one year, New York showing smaller ratios between 1893 to 1897. Comparing the data with European cities, Liverpool yields a greater proportion of deaths from scarlet fever than Boston since 1894; Berlin only in 1895 exceeded its ratio, but that largely; and Glasgow in the same year, though in but small amount. London's record was always lower, but that of Paris better still; indeed, the figures given for the rates in Paris are extraordinarily low, the highest during 1893–97 being rather less than 0·8 per 10,000, the lowest 0·22. The months during which scarlet fever is apparently least prevalent, are June, July, and August.

The death-rate among 1000 cases of the fever treated in hospital worked out at 9·8 per cent. Of the 98 fatal cases, scarlet fever *per se* killed 56; broncho-pneumonia 15; diphtheria, complicating the disease and in conjunction with it, caused 10 deaths; while of itself in mild cases of scarlatina it proved fatal in 9; pneumonia in 4; erysipelas 1; tubercular meningitis 1; and 2 ill-defined. Of the 1000 cases, 42 were complicated and proved fatal. The death-rate of the 958 simple cases only amounted to 5·8 per cent.; 11·75 per cent. afforded a diphtheritic membranous appearance in the throat, and yielded positive bacteriological evidence; while in 14·4 per cent. no membrane was present, although the diphtherial bacilli could be grown from them. About 50 per cent. of the cases in whom laryngeal diphtheria complicated scarlet fever recovered, despite the serious nature of such a conjunction.[1] Of 790 patients whose urine was examined, in 28·1 per cent. no albumin was found; in 39·3 per cent. traces were detected; and in 32·6 per cent. a small amount was obtained. As the cases in which the urine could not be obtained were chiefly those in whom the illness was very severe, the figures are of little value.

He concludes—

1. That scarlatina is more prevalent in Boston than in some of the larger foreign and American cities.
2. That scarlatina has diminished in frequency in Boston during the past three years, owing to the establishment of an isolation hospital sufficiently large to accommodate all applicants.
3. That the death-rate of scarlatina in the hospital, considering the class of cases that are treated, is remarkably low.
4. That the period of isolation in scarlatina, in order to be effectual, should be continued for a long time, at least fifty days.
5. That rest in bed and a non-irritating diet during the first few weeks of the illness are very important factors in reducing the frequency of renal complications in scarlatina.

Pearce (*ibid.*), from the bacteriological and pathological examination of a number of the preceding cases, can throw no light upon the etiology of the disease; the only constant gross change being a hyperplasia of lymphoid tissue throughout the body. Broncho-pneumonia proved to be the most frequent complication, then otitis media. The number of fatal cases in whom inflammations of the middle ear, the antra of Highmore, and the sphenoidal sinuses were present, is witness to the practical importance of such complications, the more that if recovery take place future injury to health is commonly a sequel.

CHOLECYSTITIS AND CHOLANGITIS TYPHOSA.

RYSKA, from van Jaksch's *Clinique*, contributes a paper on the clinical symptoms of these conditions to the *München. med. Wchnschr.*, for 6th June 1899. The evidence put forward by him indicates that infection of the gall-bladder and ducts by the typhoid poison may occur at very different periods or stages of the fever, and may remain latent through very various lengths of time. The onset of the infection shows itself by a rise in temperature, the occurrence of painful sensations at the site of the inflammation, and a synchronous swelling of the liver, or of the gall-bladder, whichever of these is the chief seat of the process. The severity of the attack, however, cannot always be gauged by the severity of the symptoms. The prognosis in such conditions must be very doubtful, and depends greatly upon the intensity of the original typhoid attack. Should the condition give rise to prolonged acute symptoms, operative methods should be kept in mind as giving promise of good results, especially when Alexeieff's case, in which success followed operation under somewhat unfavourable circumstances, is remembered. When the infective process is not of a severe type, the facilities for the expulsion of the poisonous agents provided by the anatomical arrangement of the parts often render the attacks abortive; although, if they should become subacute in character, or be latent, the introduction of some of the typhoid bacilli through the bile-duct into the bowel may set up a recurrent attack of enteric affection in the intestines. He suggests that it is probable that many of the inexplicable relapses in typhoid fever patients are caused by reinfection of the mucous membrane of the gut from the products of subacute or latent typhoid inflammatory conditions of the bile passages.

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[1] As deaths due to complications present are only regarded as cases of scarlet fever complicated with other diseases, the incidence of recoveries among the simple and complicated are not recognisable.

One instance of cholecystitis typhosa, and two of cholangitis typhosa are described, with recovery in each case. In the first-mentioned case it is of interest to note that the Grüber-Widal reaction which had previously disappeared was again noticed during the period of implication of the gall-bladder by the bacilli of typhoid.

Boody (*Med. Rec.*, New York, 17th June 1899) reports $5\frac{5}{9}$ per cent. of the inmates of an asylum attacked by typhoid fever as having regained their formal mental status; $16\frac{2}{3}$ per cent. of those attacked, all of them cases of dementia, as improved in mental capacity, but only until convalescence was established, when they reverted to their former state; while $2\frac{7}{9}$ per cent., represented by subjects of melancholia, regained in part their normal mental conditions, one of them so pronouncedly as to be able to resume in a fairly satisfactory manner the ordinary duties of life. The most marked example of the profound influence of mind over matter was shown by a patient with acute mania, whose mental recovery after the fever coincided with rapid nutritional improvement. Indeed, all those whose minds were beneficially affected showed physical improvement also.

Taylor, in the same journal, makes some most interesting statements as to the modification in type and incidence of malarial diseases in a region of the Ohio valley, where formerly malaria of an intense character was endemic, but where more recently typhoid fever has largely supplanted it. Is the typhoid bacillus an organism of superior power, and inimical to the malarial plasmodium?

The typhoid attacks were at first of very violent character, gradually becoming less virulent, and now in endemic form characterised by varying types each year. Taylor also refers to the influence the poison of influenza appears to exert upon the typhoid type, abating its virulence or inducing a greater predominance of the signs due to diminution of nervous energy.

MUMPS OF THE TESTICLES.

EDWARDS (*Med. Rec.*, New York, 17th June 1899) notes four cases of mumps primarily situated in the testicle; three among medical students, and the fourth in a non-medical companion of one of them. No cause could be made out for the locality of the disease, save the prevalence of a wide-spread epidemic of infectious parotitis. The glands of the neck became secondarily involved in three of the cases, but in only one was the parotitis at all prominent; nor did the parotid involvement modify the testicular conditions. Recovery was gradual but complete, with apparently no impairment of function. Such cases are of rare occurrence, and accompany some epidemics of mumps, while absent in others.

SURGERY.

UNDER THE CHARGE OF

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The Bursæ in the region of the Hip and their Diseases.

Dr. Sülzer has collected sixty cases of disease in the bursa under the ilio-psoas and in the bursa beneath the aponeurosis of the gluteus maximus over the great trochanter. The sub-iliac bursitis, of which there were fourteen examples, gives rise to a swelling below Poupart's ligament, which may extend downwards as far as the middle of the thigh; the swelling is smooth, more or less sensitive, and usually fluctuating; there may be neuralgic pains, from pressure on the adjacent nerves, and venous thrombosis from pressure on the vessels. The movements at the hip-joint may be interfered with, and the limb may assume an abnormal attitude, *e.g.* abduction, external rotation, and slight flexion, resembling that of hip-joint disease. It is to be differentiated from the latter by the absence of rigidity, of shortening, and of tenderness over the joint. The bursitis may originate from injury, or from infection with syphilis, rheumatism, or gonorrhœa. The development of a bursal hygroma may occupy several years. The bursitis over the great trochanter resembles that under the ilio-psoas, and it is to be diagnosed from a peri-articular abscess in hip disease and from disease in the trochanter itself. The bursa itself is not infrequently the seat of tuberculosis, and more often on the left side than on the right.—*Centralbl. f. Chir.*, Leipzig, 1899, No. 21.

The Use of Formalin in the Treatment of Surgical Tuberculosis.

According to Dr. Hahn of Mayence, a mixture of 1 to 5 per cent. formalin in glycerin is very much more effective in the treatment of tuberculous joints, abscesses, and empyema, than the commonly used emulsion of iodoform. He describes the results as quite remarkable, wherever the formalin is able to come into direct contact with the tubercular tissue which it is desired to destroy. In tuberculous joints the best results are obtained when the articular cavity is distended with serous or purulent fluid, and the joints best adapted for its action are the hip and knee.

In dealing with joint or abscess cavities, the pus is first evacuated by a large aspirating syringe, if possible without giving rise to any bleeding; the cavity is washed out with boracic solution until the returning fluid is quite clear; as much of the 1 per cent. formalin glycerin is then injected as will correspond to one-third or one-half of the pus originally removed. There is marked reaction, with fever, pain, and swelling of the joint for a few days. Complete recovery may follow one injection, as described, or it may have to be repeated at the end of a fortnight. The cure may be interfered with, if there are necrotic tuberculous masses in the joint or abscess cavity. Dr. Hahn does not claim to be able to cure all tuberculous joints by formalin injections, for a certain number of these are only amenable to direct surgical procedures.—*Centralbl. f. Chir.*, Leipzig, 1899, No. 24.

THE TREATMENT OF TESTICULAR TUBERCULOSIS.

IN introducing a discussion on this subject at the Surgical Society of Paris, M. Berger pointed out that there were two groups of cases. In the first of these the disease was practically confined to one testicle, and if castration were performed, it might be regarded as a radical cure; at the same time it was difficult to know when to recommend it, for on the one hand the disease might arrest itself or even resolve under general treatment, and, on the other, expectant treatment might result in the extension of the disease and death; the radical cure of the disease in one testicle by castration might be followed by disease in the other, and by the development of sinuses in the inguinal region of the side operated upon, owing to disease in the vas deferens. He does not regard disease in the prostate or seminal vesicle as a contra-indication to castration, having seen it recover after removal of the testicle. He recommends, however, the complete removal of the vas deferens along with the testicle, whether it is evidently diseased or not. If necessary, the vesicle may be attached from the perineum. M. Berger refuses to remove both testicles. M. Routier is more conservative; if there is merely a nodular induration in one epididymis, he contents himself with general treatment; if there is an abscess or sinus, he opens it up with the thermo-cautery; even where the disease is fungating through the skin, he prefers to remove the diseased tissues with the cautery than to sacrifice the organ. M. Michaux has likewise given up castration altogether; he advocates the interstitial injections of chloride of zinc and camphorated naphthol. M. Bazy was inclined to give up unilateral castration, because of the frequency with which the operation was followed by disease in the remaining testicle; where the foci of tubercle are threatening to break down, he exposes the whole length of the epididymis with the thermo-cautery, and plunges the latter into the interior of the soft foci; he maintains that it is not necessary to attack or remove all the disease in order to bring about a cure, and he leaves indolent foci to nature. M. Félizet removes the testicle in infants, when the disease is diffuse throughout the epididymis, and where it tends to involve the scrotum, otherwise he adopts expectant and conservative treatment. M. Tuffier is likewise an advocate of conservative measures, wherever possible, because, although the spermatogenetic functions of the testicle may have been abolished, the remains of the gland are still useful, because they provide the necessary internal secretion; he removes circumscribed nodules in the epididymis; he scrapes and cauterises softened foci, and only has recourse to castration when the testicle and epididymis are together enlarged like a tumour, or they are both the seat of multiple suppurating foci. M. Quénu adopts practically the same attitude as M. Tuffier; where the entire epididymis is involved, without suppuration, he excises it along with the vas, and leaves the testicle; small quiescent foci are also excised, and abscesses are scraped and cauterised. M. Réclus does not operate at all unless there is suppuration. MM. Guérin, Anger, and Potherat all advocate conservative operations. M. Lucas Championnière is practically the only speaker who disapproved of partial operations: he either awaits spontaneous cure or he removes the organ.—*Rev. de chir.*, Paris, June 1899.

NEPHROSTOMY FOR ANURIA RESULTING FROM UTERINE CANCER.

M. **CHAVAUNAZ** of Bordeaux records the case of a woman, æt. 43, who was admitted into hospital for anuria of three days' duration. The right kidney could be palpated as low down as the umbilicus; the left kidney could not be felt at all. Vaginal examination revealed a widely infiltrating cancer of the uterus. She was relieved by being bled to 500 grms., followed by injections of serum. Eight days later the anuria recurred, and serum injections were without effect. A lumbar nephrostomy was performed on the right side, and from the resulting fistula all the urine escaped; none entered the bladder from the left kidney. The woman was still alive five months after the operation.—*Rev. de chir.*, Paris, June 1899.

THE BACTERIOLOGY OF PERI-URETHRAL SUPPURATIONS.

M. **COTTET** has especially studied the anærobic bacteria in twelve cases of urinary extravasation and urinary abscess, and has arrived at the conclusion that they are present in all cases of putrid and gangrenous peri-urethral inflammations, either alone or in combination with other organisms. In one case of rapidly extending extravasation of urine, with gaseous crepitation at the spreading edge, the patient, who was the subject of a moderate stricture, had never presented any difficulty of micturition. In the intensely stinking sanious pus obtained from the perineum, the author found the colon bacillus in small numbers, and the *Bacillus funduliformis* of Hallé, an anærobic organism, in great abundance. A secondary abscess developed in the subcutaneous tissue over the knee, along with phlebitis; in the pus from this abscess the same anærobic bacillus was found in pure culture; the colon bacillus was absent.

In four cases of ordinary suppuration, *i.e.* without putrefaction or gangrene of the tissues, only aërobic organisms were found, chiefly streptococci.—*Ann. d. mal. d. org. genito-urin.*, Paris, June 1899.

EXCISION OF THE MALARIAL SPLEEN.

JONNESCO of Bucharest, since 1896, has removed the spleen in twenty-three cases, all for malarial disease, excepting one for hydatid cyst. The patients varied in age from 12 to 62 years. One died from the operation itself, seven died from the original cachexia or of complications, the remaining fifteen made a most gratifying recovery, with disappearance of all symptoms of malarial infection and of the anæmia. The author regards leukæmia as the only absolute contra-indication to the operation. He does not regard the spleen as a protective organ in malaria, but rather as the refuge in which the specific blood parasites are deposited and from which again they make their way into the circulation, so that removal of the spleen is tantamount to the removal of the chief source of malarial infection.—*Gaz. d. hôp.*, Paris, 1898, No. 123.

THE SURGICAL TREATMENT OF SEVERE HÆMORRHAGE FROM GASTRIC AND DUODENAL ULCERS.

THE deaths from hæmorrhage in gastric and duodenal ulcers have been variously estimated at 3 to 6 per cent. The bleeding usually proceeds from a vessel which is capable of being seen in the floor of the ulcer. In the case of the stomach the vessel concerned is most commonly the splenic, coronary, or some unnamed arterial branch; in the duodenum it is the pancreatico-duodenal artery. The most frequent seat of the ulcer, which gives rise to serious hæmorrhage, is on the posterior wall near the lesser curvature, and in the first portion of the duodenum.

There should be no question of surgical interference, until medical treatment has been thoroughly tried over a period of three or four weeks, in the shape of absolute rest and rectal alimentation, the patient having absolutely nothing by the mouth. If the hæmorrhage recurs in spite of this régime, recourse should be had without delay to operative treatment.

Two procedures are available—the direct method, which is directed to the ulcer and to the blood vessels concerned, and which may consist in resection of the ulcer, in resection of the affected portion of the stomach, in the application of the actual cautery, or in ligature of the artery; the indirect method is not directed towards the ulcer at all, but consists in improving the general condition of the stomach by a gastro-enterostomy. The latter method is only employed when the ulcer itself does not allow of direct interference.

Direct method.—The stomach should not be washed out before the operation. If the patient is in a critical condition, it is good practice to introduce a considerable quantity of saline solution into his veins or under the skin. The stomach is then exposed in the usual way; any contents should be evacuated by a large trocar and cannula, as if it were an ovarian cyst; when emptied it is to be examined systematically for signs of ulcer. If the ulcer is not discovered, the viscus should be laid freely open on its anterior aspect, the edges of the wound are drawn apart, and the interior of the organ mopped out with gauze. If the ulcer occupy its usual position it will then be easily seen, otherwise the posterior wall of the stomach must be everted through the wound by the fingers of an assistant, introduced into the lesser sac of the peritoneum through an opening made in the transverse meso-colon. Having found the ulcer, the best procedure is to resect the portion of stomach in which it is situated. If this is impracticable, on account of adhesions or of situation, the choice will lie between the actual cautery (which will only succeed in the case of small vessels), the ligature of the supposed bleeding point, and the ligature of the coronary or other artery at a distance from the ulcer.

The *indirect method*, which consists in the performance of a gastro-enterostomy, is indicated in cases where the hæmorrhage is less urgent but very persistent, it may be over months or years, and is accompanied by symptoms of pyloric obstruction from spasm or innocent stricture, and by symptoms of hyperacidity. The stomach is put at rest, very much like that secured to the rectum by an artificial anus in the sigmoid flexure, and the ulcer is placed under more favourable conditions for healing. It must be confessed, however, that the results of gastro-enterostomy, so far as the cure of the ulcer is concerned, have not been satisfactory.—Dr. Savariaud in the *Gaz. d. hôp.*, Paris, Jan. 28, 1899.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Adhesion of the Lower Pole of the Ovum as a Cause of Delayed First Stage.

Löhlein (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 19) refers to the frequency with which delay in the first stage is attributed to "weak pains," and the treatment by sedatives, and posture of the patient, and describes what he considers a more frequent condition than is generally recognised. Firm adhesion of the lower pole of the ovum to the lower uterine segment was first referred to by Bidder in 1868. The result of such is delay in the formation of the bag of membranes. It is generally caused by chronic endometritis, involving the whole uterus, but more frequently limited to the cervix. Such adhesion has to be distinguished from unusual thickness and resistance of the membranes, the retarding influence of which shows itself after full dilatation. It is recognised by unusual delay in the first stage, in spite of strong pains and a well-developed uterine wall. On introducing the finger into the cervix, it may be found that the membranes are more adherent at one part. If separation of the membranes is not followed by dilatation of the cervix, the adhesion is probably higher up, and it will be necessary to rupture the membranes.

Löhlein has observed this condition in fifteen out of 3000 cases, and in this paper he describes two illustrative cases.

HYSTERECTOMY FOLLOWING DOUBLE OVARIOTOMY FOR MALIGNANT ADENOMA.

BALDY (*Am. Journ. Obst.*, New York, March 1899), in a paper read before the College of Physicians of Philadelphia, again strongly advocates the removal of the uterus in all cases where both ovaries require to be sacrificed. He holds that without the ovaries the uterus is an entirely useless organ, and not only is liable to undergo degenerative changes, but is itself often the original seat of the disease which subsequently affected the ovaries. Referring to operators who are opposed to him, and who bring forward statistics showing how seldom they required to remove the uterus, subsequently to removal of the appendages, he says: "If one case of the hundred develops cancer, for instance, in the future, had it not been better to have originally removed the whole hundred useless uteri? If four or five more cases continue to suffer from their pains and aches and muco-purulent discharges until the uterus be removed at a second operation, is not the reason more convincing for a primary completed operation?" He goes on to record a case which he considers so convincing that "he who runs can read":—

Mrs. G., æt. 41, had for twelve years suffered from profuse and painful menstruation, and latterly the bleeding had been constant, and could not be controlled by drugs, nor locally applied styptics. On 26th October 1897 the uterus was curetted, with temporary relief, but the bleeding returned on January 1898 as bad as before. A left ovarian cyst, the size of an orange, was discovered on vaginal examination, and the patient was advised to have the ovaries and tubes removed, which was done on the 23rd of February. The uterus, which was large and congested, was left alone. The patient was much improved by this operation for about four months, when she was seized with violent uterine hæmorrhage, which nearly proved fatal. The hæmorrhage continued, and could only be checked by packing the vagina. About three weeks later the uterus was again curetted, with no beneficial results, and the patient was recommended to have the uterus removed. The operation, which was done by Dr. Baldy, was a very difficult one, owing to the number of adhesions, both bowel and bladder being injured. On removal of the uterus, it was found to contain a fungoid growth, which microscopically proved to be a primary adeno-carcinoma.

THE CAUSES OF UTERINE RETRO-DISPLACEMENTS.

WILMER KRUSEN (*Am. Gynæc. and Obst. Journ.*, New York, May 1899) considers the causes of this frequent condition under two heads, namely, (*a*) Virginal or nulliparous women; (*b*) parous women. Sometimes the etiological factor in unmarried women becomes more accentuated during later married life, and many causes are common to both social conditions.

A.—Causes of vaginal retro-deviation. (1) Congenital retroflexion, usually due to incomplete development of the anterior or posterior uterine walls. (2) Schultze attributes puerile retroflexion to congenital shortness of anterior vaginal wall, whence it follows that distension of the bladder, which, normally, would slightly displace the uterus, completely retroverts it. (3) Senile atrophy of the genitals, associated with shortness of the vagina, the bladder capacity remaining unchanged. (4) As the uterus is placed physiologically in a temporary position of retroversion when the bladder is full, hence prolonged over-distension may perpetuate the condition. (5) Habitual constipation necessitating severe straining effort to evacuate the bowels, a frequent factor of both virgin and parous women. (6) Masturbation, by relaxing the uterus and increasing the loss of nutritive fluids (Hildebrandt reports seven retroflexions in twelve girls greatly addicted to this vice). (7) Constitutional diseases, as chlorosis and anæmia, by relaxing the uterine supports, causing a disappearance of adipose tissue, producing constipation, and even making the uterine wall muscles lax and flexible. (8) Neoplasms, either intra- or extra-uterine, or of the appendages, may, by their presence, displace the uterus. This applies to both classes.

B.—(1) Puerperal metritis or subinvolution, which may affect the placental site, or all parts of the uterine parietes; if the placental site, say, in the anterior wall, is alone affected, this will produce a tendency to retroflexion; if the whole organ be affected, then its increased weight, along with relaxation of the round and broad ligaments, will favour its dislocation. (2) Laceration of the pelvic floor and perineum by diminishing the normal support of the organ, and permitting the development of rectocele and cystocele, is followed by either downward or backward displacement. (3) Posterior para- and perimetritis with subsequent adhesions, which may be the result, in some cases, of salpingitis. (4) Pregnancy itself may be the cause. (5) Increased intra-abdominal pressure from corsets and tight clothing, or the too tightly applied binder. (6) Traumatism, the result of blows and of falls.

The author holds that the successful treatment of such cases depends largely on an accurate knowledge of their etiology.

LABOUR AT TWELVE YEARS, WITH COMPLICATIONS.

M. J. MAGRUDER (*N. Orl. M. and S. Journ.*, April 1899) reports the case of a white girl who became pregnant when eleven years and ten months old. Gestation was uneventful. Labour was slow, but normal, and a living child, weighing 9 lb., was born. Post-partum hæmorrhage almost immediately began, and after the placenta was removed, and before the hæmorrhage was stopped, hot water was used, which was raised to such a temperature as to destroy the entire uterine mucosa, which was thrown off *en masse* a few days later. The patient became unconscious and pulseless, notwithstanding the administration of hypodermics of strychnia, digitalin, atropia, and nitroglycerin. Two pints of saline solution were then injected into the cellular tissue of the abdomen, and beneath the breasts. The patient remained pulseless for four hours, and unconscious for twelve hours after delivery, but in four months both mother and child were perfectly well.

ARE STREPTOCOCCI PRESENT IN THE VAGINAL SECRETION OF HEALTHY PREGNANT AND PUERPERAL WOMEN?

GOENNER (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 21) in 1887 examined the vaginal secretion of healthy pregnant women, and found no pathogenic organisms which might cause auto-infection. This result was corroborated by the researches of Bumm and Krönig. Other observers, however, published different results—Walthard, Koblauck, and others found streptococci in the secretions of healthy pregnant women. Goenner now makes further observations with the view of determining this question. He quotes the latest results published by Whitridge Williams, who failed to find streptococci in the secretions of ninety-two pregnant women. This observer had previously found streptococci in 20 per cent., and staphylococci in 53 per cent. of cases examined. He believes the presence of those organisms to be due to their introduction into the vagina by the speculum used. Thus, in twenty cases, agar cultures were made of secretions taken from—(*a*) vulva, (*b*) vagina, removed through an ordinary speculum, (*c*) removed through Mengi's tube. In the vulvar secretion, streptococci and coli bacilli were found in abundance, as also in that obtained through the speculum, but none in the cases where Mengi's tube was used.

Goenner gives a detailed account of the best method of obtaining secretion, free from external contamination, and gives his own results. He examined secretion taken from fifty-seven pregnant, and forty-three women in labour. In none had a vaginal examination been made, or a pessary worn. In five cases chains of cocci, irregular in outline, were found. Inoculation experiments proved them to be non-pathogenic.

Staphylococci were frequently found, but in the entire series of examinations streptococci could not be detected.

THERAPEUTICS.

UNDER THE CHARGE OF

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Chlorine Acne.

Iodine and bromine and their compounds are well known as causes of acne eruption, which is attributable to the local irritating effects of the free elements. Chlorides have not this effect, as they are more stable, and chlorine is not usually liberated in the body. Herxheimer (*München. med. Wchnschr.*, 1899, No. 9) describes the case of a man who worked in a room containing free chlorine gas, which caused an acne eruption exactly similar to that produced by the other two halogens. The whole trunk, head, and upper parts of the arms and legs were covered with a plentiful eruption, which was confined to the follicles. It consisted of papules and pustules, some of which had become eroded. The general health was somewhat affected. Three other workmen in the same room were also affected. The author thinks the chlorine was absorbed through the respiratory passages, and while being excreted irritated the sebaceous follicles. The eruption proved extremely obstinate to treatment.

ACTION OF MYDRIATICS AND MYOTICS.

PAUL SCHULTZ has worked out this subject very fully and carefully in reference to recent advances in our knowledge of the physiology of the muscles and nerves of the iris (*Arch. f. Physiol.*, Leipzig, 1898). He confirms the present teaching that atropine dilates the pupil by paralysing the terminations of the oculomotor nerve in the iris; at the same time there is no stimulation of the dilator fibres of the sympathetic. The muscular elements of the iris are left quite intact. Cocaine causes mydriasis by stimulating the dilator nerve, for after degeneration of the nerve fibres the alkaloid does not dilate the pupil. This explains why cocaine still further dilates the pupil after atropine has been applied.

Muscarine acts as a myotic by stimulating the oculomotor terminations in the iris, and physostigmine acts in a similar manner, although it has hitherto been supposed to act directly on the sphincter muscle.

ACTION OF SUDORIFICS AND ANHIDROTICS ON THE NUMBER OF LEUCOCYTES IN THE BLOOD.

BOHLAND has published a series of observations on this point (*Centralbl. f. innere Med.*, Leipzig, 15th April 1899). Healthy individuals taking an ordinary diet were selected for the observations, and they were kept as far as possible under fixed conditions, the count being conducted at stated times during the day. Atropine, camphoric acid, tannic acid, picrotoxin, ergot, tellurate of potassium, salvia leaves, agaricin, menthol, and sulphonal, all decreased the number of leucocytes very markedly—as much as 45 to 66 per cent.—the decrease lasting for from three to ten hours. They prevented the leucocytosis of digestion. Quinine has a similar action. Sodium salicylate, pilocarpine, antifebrin, antipyrin, phenacetin, ammonium salts, Dover's powder, morphine, and elder flowers all increased greatly the number of leucocytes—from 56 to 267 per cent. Hot baths have a similar effect. Control experiments on animals, however, led Bohland to the conclusion that there was no actual increase or decrease, but simply that the leucocytes were distributed differently—the peripheral vessels containing most after administration of diaphoretics, and the deeper vessels after administration of anhydrotics. In pneumonia, phthisis, and other feverish conditions where sweating is common, the author believes that the leucocytes carry the toxins to the peripheral vessels, and that the toxins are there excreted, and irritate the sweat nerves, being themselves got rid of in the perspiration.

ARSENIC IN THE ECZEMA OF CHILDREN.

NEUBERGER (*Arch. f. Dermat. u. Syph.*, Wien, 1899) states that he has treated thirty cases of eczema in very young children with arsenic, and that in all cases the result has been satisfactory. The eczema occurred mostly during dentition, and had in many cases been treated without any improvement being effected. For the first fortnight one drop of Fowler's solution was given after food, and gradually increased to six or seven drops. As improvement set in the dose was reduced. Cure occurred in six to eight weeks as a rule. Locally, sedative applications were used in addition.

TREATMENT OF ERYSIPELAS.

Allen publishes some observations on the treatment of erysipelas, based upon a series of one hundred cases (*Med. News*, Phila., 8th April 1899). In most cases a local abrasion accounted for the entrance of the organisms; in erysipelas of the face the nasal mucous membrane was very often found to be in an unhealthy condition; while in other cases the throat was evidently the channel of infection. He uses now in all cases a 50 per cent. watery solution of ichthyol, which is applied over the affected skin, and in certain cases also to the mucous membrane of the throat or nose. There is usually a marked effect within twenty-four hours. Pressure is sometimes applied locally in addition, by means of a band. Allen never now gives iron internally.

VALUE OF HÆMOGLOBIN IN ANÆMIA.

Starck (*Deutsche med. Wchnschr.*, Leipzig, 1898, No. 52) states that hæmatin and hæmoglobin are not absorbed from the alimentary canal, although they are absorbed slowly when given subcutaneously. As iron preparations they are therefore useless, and should not be used instead of the usual pharmacopœial preparations, although they are much advertised as being superior to the latter.

INSANITY.

UNDER THE CHARGE OF

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PUERPERAL PSYCHOSES.

In the *Med. Ztg.*, Vienna, for the 30th May and the 6th and 13th of June 1899, Professor v. Krafft Ebing contributes three important articles on puerperal insanity. With regard to its frequency, he states that in England the percentage of cases is only 8 per 100; in France it is from 10 to 12; in Austria, about the same number; while in Germany it varies from 13 to 21. In general terms it may be stated that where the social conditions are unfavourable, as in large manufacturing districts, especially where illegitimate sexual intercourse prevails, the cases of puerperal insanity are more numerous. Early marriages, where the female has not reached mature development at the time of conception, are undoubtedly conducive to the disease. On the other hand, in agricultural districts, where the moral and social condition of the people is good, and where too early marriages are not the custom, the affection is comparatively rare. Hereditary influence is regarded as a factor of importance in about 40 per cent. of the cases. The great physical cause is, however, to be found in the nutritive alterations and in the changes which occur in the body weight during pregnancy and after parturition. Such nutritive changes form the groundwork of corresponding functional changes in the nervous system, which render it peculiarly susceptible to physical disturbances.

The mental affections of the puerperium are divided into those of pregnancy of the puerperal state and of lactation. Two forms of the psychoses of pregnancy are differentiated—an early and a late form. The early forms are few in number and unimportant in character; they occur during the first months of pregnancy among women who are highly predisposed by heredity to insanity and to the neuroses. The symptoms are limited to disequilibrium of the psychical functions, but may end in forms of melancholia. The cessation of menstruation in persons who are in the habit of indulging in illicit sexual intercourse, necessarily suggests pregnancy and leads to emotional depression. Even in morbidly nervous married women the first indications of pregnancy may be attended with fear and agitation which leads up to slight mental disturbance. Experience shows that these mental affections disappear during the second or third months. Only in a very small proportion of cases do the symptoms continue when it becomes a question of producing abortion. It is only very rarely, however, that this course may be decided upon, for the risks are often as great as in ordinary parturition. The insanity of the later months of pregnancy is different, for it is connected with the physiological changes occurring in the body of the pregnant woman. Probably some inherited changes in the composition of the blood affect the relative proportion of the white blood corpuscles, the constitution of the fibrin or the puerperal osteophytes. On the other hand, the mental emotion caused by the near approach of the birth of an illegitimate child, the timid fear of something going wrong or the dread of pain, as well as innumerable other disturbing factors, affect the ill-balanced mind of a predisposed woman at this period. The form of mental disease in the later months of pregnancy is almost exclusively melancholia or hallucinatory insanity (Wahnsiun). After parturition, even when the labour is a normal one, there is no assurance that the insanity will end; it may even become worse, and prolong itself for a considerable time after parturition.

The insanity of parturition is also divided into an early and a late form. The early form usually occurs before or about the tenth day after birth. When labour has been protracted, painful, or attended with loss of blood, the symptoms are those of collapse delirium (inanitions delirien), such as is met with in losses of blood from ordinary causes, great exhaustions, serious illnesses, and similar states. Mania and melancholia are rarely met with in this early stage. Accompanying the symptoms already mentioned, we often meet with acute infection by micro-organisms from the genital tract. The condition is often attended by fever, and our first duty when the patient is placed in bed is to find out whether there is an increased temperature or not, upon which fact depends the diagnosis of the mental condition and its treatment, or the discovery of local affections requiring attention. The apyretic cases are usually due to shocks of post-operative character occurring in highly predisposed individuals. The later forms of puerperal insanity depend most probably upon the complicated processes of involution proceeding within the genital tract upon changes in the ovaries or upon returning menstruation. The loss of 200 to 300 grms. of menstrual blood from the weakened body of such women completes the last link in a chain of causes which tend to upset the mental equilibrium. The first signs of returning menstruation should therefore be carefully looked for, and every means adopted to check the flow.

The insanity of lactation rarely occurs before the end of the third month of nursing. It depends usually upon insufficient alimentation, and occurs most frequently in multiparæ who have borne children at frequent intervals and who have suckled them. The patients are usually neurasthenic, and the symptoms are those of a mild, curable dementia, ending often in melancholia.

The puerperal insanities are in no respect to be distinguished from other forms with a different etiology. All that can be truthfully asserted is that they manifest a severer organic symptomatology, resting upon a more serious foundation, and that we must regard them as dependent upon anæmic conditions accompanied by implication of the sensory, especially the sight, centres.

The prognosis is favourable in the pure uncomplicated cases; as many as 60 to 70 per cent. recover. In England the rate is as high as 80 to 85 per cent. With such a prognosis treatment becomes a matter of the first importance. Rest in bed is absolutely necessary in all cases. Sleep is always disturbed, and generally absent, therefore hypnotics of some kind must be resorted to. If rest in bed, with the head kept very low and the administration of abundance of nourishing food, is not sufficient to relieve the condition, such hypnotics as paraldehyde, sulphonal, or trional may be tried, with generally good effect. The most excellent of all hypnotics is chloral, but its continued use is destructive to the red blood corpuscles, and ultimately does harm. When the sleeplessness is obstinate, chloral may be given with very good effect about once a week. The patients must be liberally fed with an abundance of good nourishing, easily digestible food. The condition is one of anæmia with exhaustion, and the clear indication for its removal is a restoration of strength.

Finally, with regard to prophylaxis, the marriage of undeveloped girls should be discountenanced. After one attack the patients should be warned against the danger of another pregnancy. When there is reason to fear puerperal insanity, chloroform should, if possible, be administered during labour; labour should be facilitated by the use of forceps, and bleeding should be checked as far as possible.

HUNTINGTON'S CHOREA.

A CONTRIBUTION towards the study of this affection by Löwenfeld is published in the *Centralbl. f. Nervenh. u. Psychiat.*, Coblenz u. Leipzig, June 1899, in which the author, with the illustration of a very interesting case, attempts to dispute some of the current theories so generally accepted in connection with this affection. Chiefly does he combat the view that hereditary chorea is always attended by progressive mental deterioration ending in dementia.

The following are the main points in the clinical symptomatology and history of the case. The patient was æt. 43 when he first came under medical observation in 1889. He was married and the father of three children. He sought advice on account of severe neuralgic pains in both arms. Since between 10 and 15 years of age he had suffered from choreiform movements, affecting chiefly the muscles of the head and neck, and of the left arm. The right arm is also affected, but by movements of a totally different kind, which the patient declares to be involuntary; the fore-arm approaches the face, and the face is stroked by the hand, after which the hand is brought near the ear, etc. etc.

The choreic movements of the head and left arm are of a jerky character; they vary from time to time in intensity and in the length of the intervening interval; they are always more or less present during waking hours, but absent when the patient is asleep. These movements can be temporarily stopped by the patient by pressing his hands against his head and resting his elbows on a table. The exertion required to do this speedily exhausts the patient, and the movements return with increased intensity when the pressure is removed. The face was occasionally observed to be implicated, as seen by a spasmodic opening widely and closing tightly of the eyelids. No other parts of the body were implicated. With regard to his mental condition, the patient is unaware of any mental deterioration; his memory and his business capacity are both good, and his friends assert that his judgment is sound and unimpaired. He is subject, however, to attacks of mental depression from time to time; he suffers much from suicidal impulses, which necessitate his constantly seeking change of scene and mental distraction of various kinds. He is also subject to obsessions of a painful nature, which greatly distress him. Thus he cannot see an open knife without being haunted with the idea of cutting his throat, or an open window without experiencing a strong desire to jump through it.

The author has observed the patient for about ten years, and he is convinced that there is little or no change in the character of the symptoms. The only psychical change is a subjective feeling of inability for any prolonged mental exertion.

The following is the family history:—(1) The parents and grandparents on both sides were free from nervous and mental affections. The choreic inheritance comes from the maternal great-grandparents. (2) A maternal uncle, 70 years of age, has suffered from chorea since his youth; he has never been melancholic, and his intelligence is intact; until quite recently he was able to attend to business. (3) Two sons of the latter have choreiform twitchings of the facial muscles, and one of them is mentally enfeebled. (4) A child of the daughter of the uncle shows symptoms of chorea. (5) A daughter of the patient's sister has facial chorea. (6) A cousin of the patient's mother, who was mentally weak, became a paranoiac, and was lately sent to an asylum.

The author considers that the hereditary history in this case is quite unique, and that it tends to show that when the predisposition remains latent for some time it tends to manifest itself in a much milder form, and may even be quite removed. Huntington laid it down as a law that if the disease skipped one generation it certainly attacked the succeeding one. This rule was confirmed by Lannois, who, however, stated that in almost every family of hereditary chorea some of the members escaped free.

The freedom of the patient and of his uncle from the progressive dementia, which was hitherto considered to be an invariable concomitant of all cases of the disease, is a noteworthy fact. Again, the presence of obsessions of a painful and distressing character, and of suicidal impulses, are unusual symptoms. The author considers them to be altogether independent of the mental depression from which the patient, in common with other cases of this form of disease, suffered, and he looks upon them as psychical stigmata dependent upon hereditary mental degeneration. Finally, the peculiar movements of the right arm, which the patient states are involuntary, and which are manifestly not of a choreic character, are looked upon as a physical stigma (*tic*, of the French authors) which is also a symptom of degeneration. The author concludes that his case is an example of a lighter form of Huntington's chorea hitherto undescribed, in which the musculature is slightly involved, and in which the judgment and intelligence of the patient remain unimpaired.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF
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ADENOID VEGETATIONS.

DR. LOCKHART GIBSON of Brisbane has recently drawn attention to the importance of recognising the presence of adenoid growths in the fossæ of Rosenmüller (*Intercolon. Med. Journ. Australas.*, Melbourne, 20th Feb. 1899). The existence of hypertrophied lymphoid tissue on the lateral walls of the naso-pharynx, behind the Eustachian orifices, has been denied by some authorities. Dr. Gibson's observations in this connection are very interesting, and on account of their important practical bearing may be quoted here. He has invariably found that the hypertrophy grows from the roof of the fossa, and is situated at a higher level than the Eustachian orifice. It becomes wedged in between the Eustachian cushion and the posterior naso-pharyngeal wall. In cases of deafness, where this state of affairs exists, and where an operation is performed without any attempt being made to thoroughly clean out the fossæ of Rosenmüller, improvement in hearing fails to manifest itself. On the other hand, even if a comparatively slight amount of tissue existing in the fossa be thoroughly removed, there follows an improvement in the hearing quite disproportional to the quantity of growth removed. The deafness does not yield to treatment until this portion of the hypertrophy is got rid of, and only then if the ear trouble has not gone too far beyond the initial cause. Dr. Gibson takes care to point out that in speaking of adenoids in these fossæ, he does not include those growths which may pass into them from their attachment elsewhere in the naso-pharynx. One case out of many is quoted by the author in support of these remarks. The patient, a girl, æt. 16, had been deaf in the left ear for six months, but did not complain of the right. The tuning-fork placed on the vertex was heard in the left ear, and when placed upon the left mastoid process bone conduction was plus. The watch, which could normally be heard at four yards, was heard by the left ear at a distance of forty inches. On the right side, air and bone conduction of tuning-fork vibrations were about equal, while the watch was heard at sixty-five inches. On the roof of the naso-pharynx and on the roof of Rosenmüller's fossæ there was a general thickening of adenoid tissue, but no definite bunch of adenoids. In the sitting posture, under cocaine, and guided by a No. 4 laryngeal mirror, the growths were removed with forceps. Seven days after the operation the hearing in the left ear showed no improvement. Thirteen days after the operation there was still no improvement in the left, while the watch was heard by the right ear at four yards, the normal distance. The operation was then repeated upon the left fossa of Rosenmüller, a piece of tissue being removed from it. After some days the hearing in the left ear was normal, and has remained so.

ON THE USE OF PROTARGOL IN RHINOLOGICAL AND LARYNGOLOGICAL PRACTICE.

PROTARGOL, an organic compound of silver with protein, which has been extensively used in ophthalmic practice, and in the treatment of genito-urinary conditions, has recently been experimented with in throat and nose affections. Alexander of Berlin (*Arch. f. Laryngol. u. Rhinol.*, Berlin, 1899, Bd. ix. Heft 1) has employed it in a number of conditions, and carefully noted the effect produced. Protargol is a yellow powder readily soluble in water up to about 50 per cent., hence it is conveniently used in the form of a spray. It is also soluble in glycerine, and the addition of a small percentage of this increases its therapeutic value. The strength of the solution employed varied in different cases. In acute affections of the throat—tonsillitis, pharyngitis, laryngitis—no satisfactory results were obtained from it. A 10 per cent. watery solution appeared to produce no effect in acute tonsillitis.

In pharyngo-mycosis leptothricia it proved disappointing, and a similar experience followed its use in diphtheria, and in aphthous, specific and tubercular ulcers. In the latter condition no improvement took place, although used in concentrated solution up to 50 per cent. A more gratifying experience, however, was obtained in chronic catarrh of the nose, naso-pharynx, pharynx, and larynx; a 1 per cent. solution was used. The pharynx was painted with it, while the nose and naso-pharynx were douched and sprayed, injections of the same being employed in the case of the larynx. In atrophic conditions of the nasal mucosa, glycerine up to 25 per cent. was added. No disagreeable sensations are produced with a 1 per cent. solution; but if 5 or 10 per cent. be used a slightly bitter taste is complained of, and a somewhat burning feeling is set up for a time. In the laryngitis of patients who used their voices a great deal, a 5 per cent. solution proved of value; while in the chronic laryngitis of singers a ½ per cent. solution gave very satisfactory results.

Turning from the consideration of such catarrhal affections as these, we find that the author highly recommends its use in the treatment of chronic empyema of the antrum of Highmore. He carefully points out, however, that where secondary changes have taken place in the mucous membrane, such as the formation of polypi, irrigation with protargol does not produce the desired effect. The condition must be seen and treated before these changes take place, if any benefit is to be derived from the use of this agent. Alexander employed a 5 per cent. solution. After washing out the cavity with sterilised water, he introduced 50 ccs. of the 5 per cent. by means of a syringe through the alveolar opening, with sufficient pressure to force it through the natural orifice into the nose. This treatment is repeated daily. Eleven cases out of sixteen were successfully treated in this way. In the remaining five patients the changes already referred to had taken place in the lining membrane of the cavity. In vasomotor coryza or hay fever, favourable results have been obtained. For this purpose he commenced with a ½ per cent. solution in the form of a spray. But what proved even more satisfactory was a 5 per cent. solution rubbed into the mucous membrane. In hay fever cases he advises that the treatment should be commenced three or four weeks before the probable hay fever season.

Mycosis of the Larynx.

A UNIQUE case of this condition is reported by Gray (*Glasgow Med. Journ.*, March 1899). The patient was a male, æt. 32, who had complained of hoarseness for many years, along with a dryness in the throat and a tired feeling after speaking, the two latter symptoms being only of some months' duration. He had had an attack of rheumatism ten or twelve years before. There was no evidence of syphilis, no cough and no physical signs of pulmonary disease. When examined with the laryngoscope, the left side of the larynx was seen to be swollen, especially posteriorly, and along the ary-epiglottic fold. The swelling was most marked over the left arytenoid cartilage, and on the upper part of this there was a small greyish white surface visible, which suggested the existence of an ulcer; the left vocal cord was quite fixed. The right side of the larynx was normal. A portion of the swollen tissue was removed upon two occasions; no evidence of tubercle bacilli could be obtained, but a large number of leptothrix filaments were found. A mass of pultaceous white substance squeezed out of the swelling consisted almost entirely of leptothrix; there was no evidence of this, however, in the mouth, pharynx, and naso-pharynx. Creasote and menthol inhalations were used, and iodide of potassium was administered for a short period. Three and a half months later the swelling had disappeared, but the left vocal cord remained fixed. The author inclined to the view that the fixation of the cord was of rheumatic origin, and that the mycosis was superadded.

INTRACRANIAL INFECTION FOLLOWING EMPYEMA OF THE FRONTAL SINUSES.

A CONSIDERABLE number of cases of intracranial infection consequent upon suppuration in the frontal air sinuses have now been recorded. Reference is made here to the following case reported by Gibson (*Am. Journ. Med. Sc.*, Phila., March 1899) on account of the post-mortem appearances that were found in the sinus. The patient was a male, æt. 32, who had suffered for three years from nasal and frontal sinus symptoms. Two years before he had come under the care of the writer, the left sinus had been trephined and drained by an external opening. A persistent discharging sinus remained, and this, coupled with frontal headache, had caused the patient again to seek advice. The left sinus was therefore opened up, and when the septum intervening between it and the right had been broken down, pus was found in the latter under considerable tension. A rubber tube was passed into the left side of the nose and irrigation was practised. Two days after the operation, symptoms of meningitis supervened, and at the autopsy basal meningitis was found. The posterior wall of the right sinus was entirely wanting, and the bony edges of a nearly circular opening were smooth and well defined. The dura mater behind this was thickened and covered with granulations; the cribriform plate of the ethmoid was in part carious. The posterior wall of the left frontal sinus was perforated in two places. With regard to the opening in the posterior sinus wall of the right side, the author inclined to the view that it was a structural defect, and not due to erosion consequent upon chronic suppuration.

PUBLIC HEALTH.

UNDER THE CHARGE OF

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Enteric Fever at Cherbourg.

In this important French naval and military station enteric fever has long been known to be endemic, with periodic epidemic explosions. Since the incidence of this disease has been markedly on the troops there, the French Government has on several occasions ordered inquiries to be made, and in every case the blame has fallen on the water supply.

The strained relations with this country in 1898 led to a great increase in the number of troops at Cherbourg, and the epidemic of enteric fever which then occurred—one of the worst that have been experienced in France, and lasting from July 1898 to January 1899—caused great anxiety to the Government.

M. Valliard (*Rev. d'hyg.*, Paris, June 1899) communicates a report on the whole subject, with special reference to this epidemic. The statistics from the civil population both as to cases and deaths were not complete, but there were at least 1000 cases and 120 deaths, 700 of which, with 81 deaths, were among the troops. During the ten years 1878–87, in an average marine effective strength of 5280, the annual case rate was 69 per 1000; while in a mean military strength of 2280, the annual case rate was only 21·6 per 1000. Among the civil population it has been estimated that at the age of forty years 80 per cent. have had attacks of enteric fever of a mild or severe type.

The water supply of Cherbourg is taken from the Divette, a small river which runs through a valley in an agricultural district manured by the contents of the *fosses d'aisance* of the town and its environs. This manuring is chiefly done in autumn, at which period also the heaviest rainfall occurs. Besides this source of pollution, there are several villages on the banks of the river which discharge their refuse into it. The chances of pollution of the water supply, always present, are evidently markedly so during the heavy rains in autumn. With the exception of a small contingent, the marines take their water from this river; while only one company of the military uses this water, the rest getting their supply from a spring.

The epidemic appearance of enteric fever has always followed heavy rains, and while those drinking river water have suffered heavily, those drinking either spring or rain water have escaped. In 1889 the Ministry of War ordered all the water supply for the soldiers to be boiled, and later introduced filtration by Pasteur-Chamberland filters, which has been carried out with great care and under strict supervision. The cases among them, which had been 110 in 1888, and 119 in 1889, fell successively during the following years from 21 in 1890 to 6 in

1897, and these cases were traced to the troops when in Cherbourg drinking the town supply. Pasteur-Chamberland filters were also introduced into the barracks of the marines; but their use was so badly supervised, that the filtered water cistern often contained a considerable amount of mud, showing that some of the water was escaping filtration either by passing through cracks in the porcelain filtering bougie, or through the connections not being tight. Moreover, when the river is in flood, the water contains much suspended mud, and this in time must choke the filters, and reduce the output of filtered water. The bougies were only cleaned once a year, and yet the output remained constant! In 1894 the municipality introduced filtration of the river water by Maignen's system, *i.e.* through carbo-calcis charcoal, and asbestos. The results were disappointing as to reduction of enteric fever. During seven years—1887–1893—there were 117 deaths, and for five years—1894–98—there were 97 deaths.

In the first six months of 1898 there had been only nine deaths from enteric fever in the entire civil, naval, and military population of Cherbourg. In July and August there was a distinct increase in the number of cases, and these were both in the town and its environs. Then came the war scare, and the garrison was greatly strengthened. As usual the autumn rains set in, and in the first fortnight of November there were 100 cases among the marines. The reinforcements received in October were replaced by fresh troops. A renewal of the heavy rains was followed by another outbreak, with 400 cases among the marines in less than a month. In one regiment of marines, numbering 1025, there were 239 cases in about a fortnight. The military, supplied by filtered spring water, remained practically free from enteric fever.

In war time the incidence of this fever is greatly increased, and M. Valliard points out the great risk of disaster had war broken out during this epidemic. Adapting the orders of Napoleon to his Minister of War during our Walcheren Expedition in 1809 to the present state of affairs at Cherbourg, he thinks that unless a pure water supply be obtained, a time may come that a foreign fleet coming against Cherbourg may receive a similar order, "Abstenez vous de tout coup de force, restez sur la défensive, la Divette et la fièvre typhoïde combattront pour vous!"

PHOSPHORUS POISONING IN LUCIFER MATCH MANUFACTORIES.

A FEW months ago there was issued the Government report on "The Use of Phosphorus in the Manufacture of Lucifer Matches," by Drs. Thorpe Oliver and Cunningham, with a prefatory memorandum by Dr. Whitelegge. In it much attention is given to the experience in French match factories, especially in the two at Pantin and Aubervilliers, near Paris. M. Courtois-Suffit, one of the Paris hospital physicians, who has medical charge of these factories, showed, in previous communications to the French Academy, the great diminution in necrosis of the jaw which had followed on his rigorous attention to the state of the teeth of the operatives. "Every worker having a carious tooth was put under periodical and frequent observation, and if the caries involved the pulp of the tooth he was suspended from work for at least two months. The tooth was extracted, and when the wound was entirely healed he returned to work. During the two years' application of these measures, not a single fresh case of necrosis occurred, notwithstanding the fact that the general hygienic state of the works leaves much to be desired." Dr. Whitelegge discusses the two views held as to the way in which phosphorus or its lower oxides affect the system, viz. simply locally, as an irritant of exposed bone, chiefly the bone of the jaw, or, generally, by inducing a constitutional state, called phosphorism by some continental writers. He considers that a "gradual change in the nutrition of the jaw, lessening the resistance to inflammatory processes, but incapable in itself of giving rise to necrosis, would seem to offer the simplest explanation of the long duration of exposure to phosphorous fumes which is necessary before necrosis results even in the most favourable circumstances." In all the cases in which the pus was examined bacteriologically, Dr. Oliver found putrefactive organisms, streptococcus and staphylococcus, but he failed to find the bacillus of tubercle, though careful search was made for it.

M. Courtois-Suffit (*Presse med. belge*, Bruxelles, 3rd May 1899) contributes a paper on so-called phosphorism, which, from his exceptional opportunities of study, is of great value. According to M. Magitot, this is a kind of intoxication by phosphorus from which all workers in lucifer match works suffer without exception, its intensity varying with the individual as well as with the hygienic state of the factory. The general symptoms are, jaundiced look, garlic odour of the breath, anæmia, albumin in the urine, and relative increase in the mineral constituents of the urine, showing a demineralisation of the organism, while individual cases show chronic enteritis, nephritis, bronchitis, fragility of bone, and, most important of all, necrosis of the jaw. He examined the urine in thirty-two cases, and found that the increase of the co-efficient of demineralisation cannot be considered as a criterion of phosphorism. Applying the ordinary clinical methods for testing for albumin, he found none in thirty of these cases. As regards nephritis, the only case he ever saw occurred after yellow phosphorus had been replaced by the sesquisulphide of phosphorus in the making of matches. As regards fragility of bones, he quotes statistics from the factory at Marseilles, which show that during twelve years there were only two cases of fracture. At the Pantin-Aubervilliers works there was only one case of fracture in three years. It was caused by a violent kick, and is now quite firmly united. He finds no predisposition to tubercular disease; indeed, statistics would seem to show that, as a class, French match-workers suffer little from this disease, and this he attributes to the good wages many of them earn, enabling them to be well fed. He concludes that, "if one excepts the necrosis of the jaw, which is certainly due to the influence of the fumes of yellow phosphorus on a jaw with dental caries, one sees nothing specific in the action of phosphorus on the general health."

THE STERILISATION OF POTABLE WATER BY OZONE.

M. CALMETTE (*Ann. de l'Inst. Pasteur*, Paris, tome xiii. No. 4) gives an account of an investigation on this subject, carried out on the water supply of the town of Lille. The supply is from springs in the chalk, which are situated in a valley largely agricultural, and hence the water is liable to be contaminated by surface impurities. Mm. Marmier and Abraham have made improvements on the methods for sterilising water by ozone on the large scale, and the municipality of Lille appointed a commission to report on the efficacy of their system. The commission consisted of two chemists and two bacteriologists, the latter being M. Roux and M. Calmette. For producing the ozone an electric current of 40,000 volts is used. In the ozoniser, the electrodes, which are metallic with plane smooth surfaces, are placed with each face in contact with plate-glass, and arranged as follows:—electrode, plate-glass, interval of space, plate-glass, electrode, and so on. The air can be ozonised as highly as 10 mgrms. of ozone per litre, but most of the experiments were made with air with 5 to 6 mgrms. per litre. The ozonised air passes from the ozoniser into a large column and there comes in contact with the water to be sterilised, which falls as a shower through this column. From the bottom of this column the water is led to the reservoir for distribution to the town. The output of sterilised water was at the rate of about 8000 gals. per hour. All the pathogenic or saprophytic organisms met with in water are destroyed by this treatment. The only micro-organism that resists the action is *Bacillus subtilis*. When the air contained 6 mgrms. of ozone per litre they found one of these organisms in 15 c.c. of the water from the ozonising column. Moreover, the treated water contains no ozone after quite a short time, as is proved by the growth of micro-organisms in it if intentionally added. They recommend its adoption by the municipality. If this process be applied to waters which contain much suspended matter, *e.g.* rivers in flood, etc., then a previous rough filtering through sand would be required.

REPORTS OF THE MEDICAL SOCIETIES.

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Edinburgh Medico-Chirurgical Society, *5th July* 1899.—Sir J. **Batty Tuke** in the chair.—Mr. **Stiles** showed—(1) A child two months after operation for large hydrencephalocele; (2) a child after operation for extensive tuberculous osteomyelitis of the tibia; (3) child after excision of the wrist for tuberculous disease.—Dr. **Alex. Bruce** showed a patient suffering from auditory aphasia.—Dr. **Bruce** showed microscopic specimens of the spinal cord, showing that in progressive muscular atrophy there is atrophy of the cells of the anterior cornua, while in amyotrophic sclerosis there is no such degeneration of these cells.—Mr. **Stiles** and Dr. **Rainy** showed skiagrams of—(1) Tubercular ankle; (2) separation of the lower epiphysis of the humerus; (3) fracture at the junction of upper and middle thirds of the shaft of the femur, showing typical displacement of the upper fragment.—Dr. **Harvey Littlejohn** showed specimens of—(1) Strangulation of the intestines by the omentum; (2) intussusception of the ileum; (3) stomach and intestines from two cases of hydrochloric acid poisoning.—Mr. **Cotterill** showed a dermoid cyst of the ovary.—Dr. **Bruce** and Mr. **Cotterill** contributed a paper on "A Case of Cerebellar Tumour, considered from the point of view of Localisation and Treatment." The patient was a man æt. 34, who was admitted on 3rd April of this year. His history was as follows:—Five years ago he completely lost the sense of hearing in the left ear; three years later he could not walk so well as formerly, owing to a tendency to fall to the left side. He also, when he wanted to use his left arm, had to make a special effort and concentrate his whole attention on the act. His gait became unsteady. About seven months ago he had vomiting, and about a month later suffered from severe left-sided occipital headache and sudden attacks of transient dimness of vision. His state on admission was as follows:—There were headache and tenderness over the left occipital region; optic neuritis in both eyes, which had advanced to optic atrophy in the right eye; slight nystagmus in all positions of the eyes, especially marked on looking to the right: the movement, though present, was much slower when the eyes are turned to the left; the fields of vision were very contracted; there was some paresis of the left side of the face; there was complete deafness in the left ear; there was fine tremor in the right hand, coarser tremor in the left. In walking he tended to fall to the left side; the knee-jerks were practically normal. All these symptoms pointed to a tumour interfering with the functions of the nucleus of Deiters in the middle lobe of the cerebellum. This nucleus presides over the co-ordinated movements of the eyes through its connection with the sixth nerve, and over those of the limbs through its connection with the spinal cord. These tumours generally grow from the side of the petrous temporal bone, and Mr. Cotterill operated in the hope that this was one of that description. The tumour, however, was found to be embedded in the substance of the cerebellum, and consequently no attempt was made to remove it. The patient died three days after operation, and at the post-mortem examination the tumour was found in the flocculus.—Dr. FOULIS read a paper on "Some Observations on the Development of the Testicle." In early stages of development the male and female reproductory glands resemble each other very closely, but the ovary is destitute of capsule, and thus the two can be distinguished by teasing the glands under water. In the capsule of the embryo testicle there is a minute hole. The duct on the back of the Wolffian body joins the testicle at this point. The orifice is occupied by a solid cellular column, which grows forward into the capsule, giving off lateral offshoots. These distend the capsule. The offshoots become tubular, are lined with cells derived from the central column, and become the tubuli seminiferi. Thus the whole of the tubular elements of the testicle enter at one spot, and are connected directly with the end of the Wolffian duct.

EDINBURGH OBSTETRICAL SOCIETY.—12*th July* 1899.—Dr. BREWIS, Vice-President, in the chair. SPECIMENS were shown by Dr. KEPPIE PATERSON, Dr. HAULTAIN, Dr. HAIG FERGUSON, and Dr. J. W. BALLANTYNE.

COMMUNICATIONS.—Dr. MACVIE read a paper on "Mother *versus* Child: Notes of a Case of Induction of Premature Labour in a Patient who had Carcinoma of the Rectum." Dr. Macvie was called to see a case, and discovered on examination that there was partial obstruction of the bowels, owing to a large cancerous mass in the rectum. This was relieved by enemata. The question arose as to whether he ought to induce labour or to allow the pregnancy to go on to full term, and then perform Cæsarean section. He favoured the former treatment, but in consultation he was advised to wait. However, at the seventh month, the symptoms of ileus became so urgent, and Dr. Macvie considered the risks of spontaneous premature labour should it occur later so great, that he decided to terminate the pregnancy. This he did successfully, and delivered a living child. Dr. Macvie discussed the question of the proper treatment from every point of view, and argued that his plan of inducing labour was the better.—Dr. BERRY HART read a "Note of a Case of Fibrous Mole." He gave the history of the case, showed the specimen, as also several microscopic slides illustrating the condition.

OBITUARY.

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Sir Alexander Armstrong, K.C.B., M.D., F.R.S.

The death of this well-known officer, which occurred on 4th July, removes an interesting link with the past. Of Scoto-Irish origin, he was also partly Irish and partly Scottish by education, since he studied in the Universities of Dublin and Edinburgh. He graduated in the latter school in 1841, and entered the navy a year later. After service in almost every quarter of the globe, he accompanied the ill-starred expedition of M'Clure in search of Sir John Franklin. At a later period he took part in the Crimean war, and afterwards was in charge of the great hospitals at Malta, Haslar, and Chatham. In 1869 he became Director-General, and held the post until 1880. His opinion on all matters connected with Arctic exploration was of the highest value, and his best energies were always employed in furthering the good of the service, and in upholding the honour of his profession.

Sir William Henry Flower, K.C.B., F.R.S.

A native of the "Heart of England," Sir William Flower, after studying at University College, London, entered the ranks of the medical profession as a Member of the London College of Surgeons in 1854, and went at once on active service in the Crimea. He was present at the engagements of Alma, Inkermann, and Balaclava, and passed through the siege of Sebastopol. On the conclusion of the war, he was appointed Assistant-Surgeon to the Middlesex Hospital, and while acting in this capacity produced his well-known work—one of the earliest of a long series—on the upper extremity, in which he showed at once his power of diagrammatic teaching and his tendency towards scientific inquiry.

Appointed, in 1861, Conservator of the Museum of the Royal College of Surgeons, he found his real sphere of action. During the years of his occupancy of this post, he not only carried out a thorough classification of the great museum, but brought out many important works, chief amongst which were his contributions to the Anatomy of the Mammalia, and to Anthropology. He was appointed in 1884 Director of the Natural History Department of the British Museum, and he held this office for fourteen years. Last year, on account of failing health, he resigned the post, and on 1st July he peacefully passed away, amid the profound regret of a very large circle of relations and friends.

ANALYTICAL REPORTS.

Esvach Water.

(Davy, Hill & Son, Yates & Hicks, Southwark, London, S.E.)

Esvach Water is an example of an aperient water particularly free from the disagreeable tastes so common among its class, while in addition it certainly acts efficiently after its manner without griping. No mention is made as to whether it is derived from a natural spring or not; but the name it bears is not assignable to any natural source known to us, or to be found in print. However that may be, the water itself, be it natural or prepared, contains almost exactly 5 per cent. of salts when dried at 100° C. Of these salts 77·5 per cent. may be reckoned to be in the form of sulphates of magnesium, sodium, and potassium, 1·6 per cent. as chloride of sodium, 19·2 per cent. as bicarbonate of sodium, corresponding to 3·9 per cent. of aperient sulphates and 0·96 per cent. of bicarbonate of sodium in the water. It is valuable all the more in that it contains no lime salts in any form whatsoever. The usual proportion of sulphates to carbonates and bicarbonates of sodium, potassium, and similar metals, with the exception of calcium, obtaining in the most commonly used aperient waters (such as Carlsbad Sprudel, Hunyadi Janos, etc.), is from 60–65 to 1; in Esvach the proportion works out as 4 to 1, or thereabout. As the carbonic dioxide present (5·2 per cent.) is more than sufficient to render its compounds with the bases, which are left over after all the sulphuric anhydride and chlorine has been used up, fully saturated bicarbonate salts, and still to leave about ·02 per cent. by weight in a free form, it gives the water a pleasant fresh taste. The excess of bicarbonate of sodium renders the water slightly alkaline, and therefore of value as a laxative in uric acid conditions, and in habitual constipation with absorption of acid products. The dose of Esvach Water is given as 2 oz., equal to 37·4 grs. of the combined sulphates, and 9·3 grs. of bicarbonate of sodium, quite a correct officinal dosage for repeated exhibition, and properly productive of excellent results.

Emol-Keleet Soaps.

(The Keltie Products Ltd., Dunning, Perthshire.)

Emol-keleet is the somewhat Eastern name for a Scottish product. It corresponds to kaolin and fullers' earth, in so far that it contains a large proportion of native silicic compounds of aluminium; but while the other two substances are composed almost wholly of these aluminium salts, Emol-keleet contains some lime and steatite as well. When the emulsive properties of soapstone are borne in mind, the rationale of the employment, in the form of soap, of an earth so nearly akin to it, in virtue of the steatites present, is obviously sound and most reasonable. The powdered earth itself, when added to water, possesses a considerable power of forming emulsions of fatty bodies, softens hard waters containing lime salts, cleanses the skin as thoroughly as ordinary soap, and even acts so strongly on the outer layers of the skin that a moist paste formed from it, applied to the skin and covered with guttapercha tissue, will result in such marked effects, that the outer epidermis can be removed in course of time without discomfort.

When a powder possessing these attributes is combined with a neutral superfatted soap, the cleansing powers of the compound should be great indeed. Two soaps are made from it—the Emol-keleet "Natura" and "Perfecta" soaps. The "Perfecta" is the lighter in colour; more strongly and more agreeably scented. Both, when dissolved in water, yield only a moderate response to tests for alkalinity, but none of the alkali present is in a free and therefore undesirable condition.

These soaps, then, afford first-class examples of the class of superfatted soaps, in which, however, there is no excess of free unaltered fat, supposed by some to be hurtful—the Emol-keleet removing the necessity for addition of too much fat.

The most valuable results we have obtained from the use of these soaps have been in the treatment of chapped and rough skins in winter, irritable and erythematous states of the epidermis after much exposure to sun or wind, and in mild eczema or simple forms of dermatitis.

As ordinary cleansers of the skin they act in a most efficient way, but at the same time cause absolutely no irritation whatsoever, as far as clinical observation shows, and leave the surface smooth and clear. Acting best when used with warm water, they are not much less efficacious should cold water be employed. The soaps are indeed of such a nature that they will no doubt achieve the prominence they merit.

HEROIN HYDROCHLORIDE.

(The Bayer Co. Ltd., 19 St. Dunstan's Hill, London, E.C.)

IN March of this year we had occasion to refer to Heroin, a derivative of morphina, prepared by the Elberfeld Farben Fabriken vormals, F. Bayer & Co., while a reference to its actions and uses was included last December in our therapeutic section. The diacetic ester of morphina, heroin, itself is but sparingly soluble in water, and thus unsuitable for subcutaneous injection. The great value undoubtedly possessed by it of soothing all forms of respiratory irritation and discomfort led to the expression, on the part of physicians who had experienced good results from its use, as to the desirability of introducing a neutral salt of heroin which would be easily soluble in water. The firm was equal to the occasion, and has now placed the hydrochloride of heroin upon the market. While dionin, another hydrochloride derived from morphina and recommended for use hypodermically, dissolves in water in the proportion of 14 to 100, this new salt gives 58·9 to 100 as its soluble ratio. It is also easily dissolved in alcohol. It is in the form of a white, finely crystalline powder, with a mildly bitter taste. When first administered by hypodermic injection, not more than $\frac{1}{24}$ gr. to $\frac{1}{12}$ gr. should be given; later, the dose corresponds to that of heroin itself—$\frac{1}{12}$ gr. to $\frac{1}{6}$ gr.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Five Weeks ending July 1, 1899; and for the Year from January 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean .	53°·9	*[1] 390° [2] 831°	3° 649°	2·5	13·6	208	697	2°·6
Observed	56°·1	[1] 494° [2] 875°	0° 669°	1·9	16·8	245	744	3°·14
Difference	+2°·2	[1] +104° [2] + 44°	− 3° +20°	−0·6	+3·2	+37	+47	+0°·54

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland (Edinburgh, Dundee, Aberdeen, and Leith), during June, and since January 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1]1,045 [2]6,987	183·4 204·0	233 1350	40·8 39·4	96 667	16·9 19·4	180 1461	31·7 42·6	122 775	21·4 22·6
Actual Deaths and Rate per 10,000	[1]1,031 [2]7,033	180·8 205·3	236 1424	41·3 41·5	100 645	17·6 18·6	146 1328	25·7 38·6	146 823	25·7 24·0
Difference from Mean	[1]− 14 [2]+ 46	−2·6 +1·3	+ 3 +74	+0·5 +2·1	+ 4 −22	+0·7 −0·8	−34 −133	−6·0 −4·0	+24 +48	+4.3 +1·4

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 73 [2] 406	12·8 11·8	29 173	5·2 5·0	80 548	14 16	117 684	20·5 20·0	53 290	9·3 8·4
Actual Deaths and Rate per 10,000	[1] 72 [2] 419	12·7 12·2	28 169	5·1 4·9	73 601	12·7 17·5	119 698	20·2 20·4	44 327	7·8 9·4
Difference from Mean	[1] − 1 [2] +13	−0·1 +0·4	−1 −4	−0·1 −0·1	− 7 +53	−1·3 +1·5	+ 2 +14	+0·3 +0·4	− 9 +37	−1·5 +1·0

* Note.—The figures [1] denotes the data for June, [2] for year to date.

The five weeks which ended on 8th July were principally remarkable for the drought which characterised the first three of their number. In these weeks only a fraction over 0·1 of an inch of rain was recorded in the East of Scotland, as against a normal precipitation of 1·5 in. The type of weather was uniformly anticyclonic, the mean temperature 3°·2 over the mean, and the hours of bright sunshine so many that the excess reached 50 per cent. of the usual total amount. For these three weeks the percentage of actual sunshine to the total number of hours possible came to 55 per cent.; one week, the last of the three, giving the very high percentage of 62 per cent. The excess of accumulated day-degrees of warmth above 42° F. over the normal was equally marked, amounting to 83° in twenty-one days, or nearly an addition of 4°·5 per diem to the continuous warmth of the air. The actual maximum temperature observed was 85° during the third week; the highest recorded for that week in the United Kingdom. When the data for the last two weeks are added, the record for the whole period loses much of its unusual character, for, although warmer than usual, these weeks were more sunless, and the last one very wet. Still the totals yield a plus balance in warmth and bright sunshine, but a deficiency of rain. The variability of temperature from day to day, largely owing to the values for the third and fifth weeks, is considerably above the average.

The data accumulated since 1st January are greatly altered in value compared with those shown at the end of last month; a deficiency of 60° in day-degrees above 42°, has become an excess of 44°; a slight excess in the hours of bright sunshine becomes a much more marked one, while the excess of rain recorded has fallen from 34 to 23 per cent. of the normal.

The favourable weather of the month was accompanied by a diminished death-rate, especially noticeable under deaths caused by respiratory diseases, pneumonia, and cancer; the variations from the normal under the other classes being unimportant, save for a considerable increase of fatal nervous cases. Influenza directly caused seven deaths.

For the first six months of the year the number of deaths caused by respiratory and circulatory diseases show a marked decrease, deaths from constitutional, nervous, digestive disorders, pneumonia, and cancer an increase.

June therefore, warm, dry, and unusually bright, shows a lessened rate in total mortality, a decrease under respiratory deaths, 18 per cent. of the number expected, an increase of deaths from cardiac disease; while the year to date, practically with normal warmth, an excess of rain, and increased sunshine, yields an increased number under total, under constitutional, nervous, and digestive systems, pneumonia, and cancer; but a much lessened mortality from respiratory diseases.

THE ANNUAL MEETING OF THE BRITISH MEDICAL ASSOCIATION.

THE arrangements for the annual meeting of the British Medical Association at Portsmouth are now approaching completion, and there is every prospect of the gathering proving a highly successful one. This will be the first visit of the Association to the great dockyard town, although invited to meet there both in 1891 and in 1897.

On only two previous occasions has the Association held its annual gathering within the area of the Southern branch—at Southampton in 1840, and at Ryde in 1881.

Portsmouth is fortunate in possessing a sufficient number of rooms large enough for the sectional and general meetings of the Association, and these, by the kindness of the authorities concerned, have been placed at the disposal of the local committee. As they are all situated in the immediate neighbourhood of the Town Hall, the arrangements for the meeting have been simplified. The reception room and most of the sectional rooms are close to the Portsmouth Town Railway Station, and in the main thoroughfare leading to the principal parts of Southsea.

Following Goodwood race week, and coinciding with Cowes regatta week, the annual meeting will take place when Southsea is at the fullest and gayest, and when every facility exists for holiday enjoyment.

It is unnecessary to expatiate upon the normal attractions of Southsea: upon its brilliant sunshine, its extended and open front, its excellent bathing and yachting, its admirable military bands, and numerous marine excursions, or on the interests attaching to it as an important military and naval arsenal. Many of the departments of the arsenal are ordinarily open to visitors, and, by the kind permission of the naval and military authorities, others not usually shown will be open to the inspection of members of the Association. Parties will be conducted round the military hospitals, the various barracks, and the armoury, and will have the opportunity of witnessing displays of physical drill and of ambulance drill.

The Commander-in-Chief at Portsmouth, Admiral Sir M. Culme-Seymour, has kindly arranged that members may be specially conducted over the dockyard and warships; and for limited parties being shown over the gunnery and torpedo schools, which are situated respectively on Whale Island and on H.M.S.

Vernon. Special trains will take the visitors through the dockyard, and gunboats will be provided to convey them up the harbour. These establishments are not usually accessible to visitors, and even residents in Portsmouth seldom have the opportunity of seeing them. In like manner the Clarence Victualling Yard and the Royal Naval Hospital at Haslar may be visited. The hospital, built about one hundred and fifty years ago, has beds for about 1500 patients; and contains a considerable museum of natural history and pathological specimens; but, as the Government abolished the post of curator some few years ago, this is now in poor condition.

The Station Hospital at Portsmouth is an example of the average military hospital; soon to be replaced by a larger building outside the city under Portsdown Hill.

Portsmouth is not a great centre of medical work; but the local medical institutions, such as they are, will be open for inspection by members.

The Borough Asylum at Milton is worthy of a visit by those who are interested in asylum construction and administration. An opportunity of seeing it under pleasant circumstances will be afforded by the Mayor's garden-party to be held in its extensive and well-kept grounds.

The Portsea Island Union Infirmary is interesting on account of the new pavilions fitted up for 100 acute cases, and for the nurses' quarters recently opened. The pavilions are fitted with all the modern improvements, and constitute well designed and convenient wards. The older part of the infirmary is not so satisfactory. The parish guardians have recently strengthened the medical and nursing staff, and seem to favour a forward medical policy. The principal medical charity is the Royal Portsmouth and Gosport Hospital. Like the Union Infirmary, it has received a recent addition in the form of two pavilions for forty beds each. These have been recently completed and opened for use as a memorial of Her Majesty's Diamond Jubilee. They form part of a complete scheme of reconstruction which, when finished, will result in an excellent building, skilfully contrived, in accordance with modern ideas, to afford accommodation for 160 patients, with offices, etc. The Portsmouth and South Hants Eye and Ear Infirmary comes next to it in importance and value. It also is in a state of constructive transition. The specially designed building which replaces the former dwelling-house is almost finished, and will be shortly ready for occupation. It will contain beds for twenty in-patients, and will afford every facility for the treatment of the special diseases of the eye and ear.

Our Portsmouth brethren are sparing no effort to render the visit of their fellow-members as agreeable as possible. Tuesday evening will, as usual, be devoted to the delivery of the President's address, and the reception of the foreign guests.

On Wednesday the President and Reception Committee will entertain the members and their friends, and a large number of local guests, on the Clarence Esplanade Pier.

On Thursday the customary dinner of the Association will take place in the Great Hall of the Town Hall. It is expected that there will be about 350 guests. Music and theatricals and other amusements will be provided. It is expected that some of the lady guests will take the opportunity of listening to the after-dinner speeches from the gallery, and, on the other hand, that some of the diners may be pleased towards the end of the evening to accept an invitation by the ladies' committee to a reception.

On Friday evening, 4th August, the Mayor of Portsmouth will give a ball to the Association in the Town Hall.

The official service will be held on the morning of 1st August at the beautiful church of St. Mary's, Portsea. The sermon on this occasion will be preached by the Lord Bishop of Winchester.

The Right Rev. Dr. Virtue, the Roman Catholic Bishop of Portsmouth, has, at the request of many of his co-religionists, arranged for a service to be held at the Roman Catholic Cathedral of St. John, Portsmouth, for the benefit of the Roman Catholic members of the Association. The service will take place at the same time as that at St. Mary's, and will consist of special service, High Mass and Sermon by the Right Rev. Monsignor Cahill.

During the week members are invited to garden-parties by the Inspector-General and medical officers of the Royal Navy at Haslar Hospital, by Colonel-Commandant Poore and officers of the Royal Marine Artillery at Eastney Barracks, by Surg.-Gen. Nash and officers of the Royal Army Medical Corps at Netley, by Mr. Montagu Foster at his residence at Stubbington, near Fareham, and by Mr. Benjamin Barrow at his residence, St John's, Ryde.

On August 1st a party will visit Porchester Castle, when the points of historical and archæological interest will be fully explained.

Parties are also invited to visit the Portsmouth Drainage Works, the Portsea Island Water Company's Works, and the Parchment Works at Havant.

Those who are fond of golf are invited to take part in a golf tournament on Friday, 4th August, and may be elected honorary members of the local golf clubs during the week.

Members attending the meeting may also be made honorary members of several of the social clubs during the week of the meeting, but, owing to the pressure on their accommodation at that period of the year, this privilege is necessarily limited.

A special suite of apartments has been reserved at the Town Hall for the use of lady members of the Association and for lady friends of members. Members of the ladies' committee will be in attendance to welcome their guests, and will provide tea and other light refreshments.

The Pathological Museum will be located in the Boys' School of the Seamen and Marines' Orphan Home. A special object of the museum committee has been to illustrate the progress of naval and military surgery during the present century. The loan of specimens for this purpose has been promised from the collections of the Naval Hospital at Haslar, the Military Hospital at Netley, and from the museums of several London Schools.

The Trade Museum will be placed partly in the spacious drill hall of the Volunteer Artillery and partly in the neighbouring Board school. Both buildings are close to the Reception Room.

On Wednesday, 2nd August, Sir Richard Douglas Powell, Bart., M.D., will deliver the address in Medicine, and on the following day Professor Alexander Ogston of Aberdeen will give the address in Surgery.

The scientific business of the meeting has been organised on the usual lines, and will be conducted in twelve sections.

Naturally at Portsmouth an unusually large number of naval and military surgeons propose to take part in the proceedings, and several of the subjects selected for discussion are of special interest to service men. Such is the discussion on "Medical Tests required for Admission to the Public Services," which will occupy the attention of the section of Medicine on 2nd August, and the discussion in the surgical section on the "Diagnosis and Treatment of Gunshot Wounds of the Abdomen." The second subject on the programme of the surgical section, the "Prevention and Treatment of Syphilis in the Army and Navy," is one which has largely exercised the minds of service surgeons for some time, but also raises important issues for the profession at large.

We suppose it is inevitable at the present juncture that both the section of Medicine and that of State Medicine should be largely occupied with the subject of Tuberculosis.

In view of the interest recently excited in the subject of tropical diseases, it may be anticipated that the section of Tropical Diseases will be as great a success as it was at Edinburgh.

On going through the programme, we are struck by the number of papers which it is proposed to illustrate by lantern demonstrations. This is far more convenient than demonstrating specimens under the microscope, and we learn that the local committee have set apart a room expressly for lantern exhibitions, an example which will no doubt be generally followed in the future.

Mr. Mackenzie Davidson and Dr. Hugh Walsham will give a demonstration of the applications of X-ray photography to Medicine and Surgery.

Mr. Noble Smith proposes to show, by means of the microscope, moving photographs of patients afflicted with Friedreich's disease, congenital dislocation of the femora, athetosis, infantile paralysis, and other diseases.

The presidents and members of the district societies, into which the Southern Branch is divided, have invited parties of members and friends to visit their respective localities. These excursions will take place on Saturday, August 5th.

Mr. Jonathan Hutchinson invites a party to Haslemere, to see an educational museum, and to visit the beautiful scenery of Hindhead.

The Salisbury District will receive a party to luncheon, and after a visit to the Cathedral will conduct them by coach to Stonehenge. Tea will be provided at Amesbury by Dr. P. J. Bancroft, after which the party will return to Salisbury by coach.

The Southampton District will conduct a party in carriages through the New Forest, lunching at Lyndhurst. The journeys between Southsea and Southampton will be made by boat.

Another party will take boat to Cowes, and, after a long day's drive through the Isle of Wight, visiting Carisbrooke, Ventnor, Blackgang, and the Undercliff, will return to Ryde by train, and thence by boat to Southsea.

Several of the principal railways have consented to grant reduced tickets to members of the Association attending the meeting. Those having return tickets to London or to the West of England will be allowed to break their return journey on Saturday at Winchester and Salisbury respectively, thus being enabled to join the excursions to these places without paying any additional fare.

A large party has been invited by the Winchester District Society to visit the Cathedral, College, and other objects of interest, and to partake of luncheon and tea.

On the same afternoon, Surgeon-General Cuffe and officers, Royal Army Medical Corps at Portsmouth, will take a party of guests for an excursion round the Solent. In the evening, members will be admitted to the torchlight tattoo, which Captain Davies, the Dep. Ass.-Adjt.-Gen., has arranged to take place in the Men's Recreation Ground.

July 1899.

EDINBURGH MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

SOME POINTS IN THE MECHANICS OF THE SKELETON.

By W. Arbuthnot Lane, M.S., *Surgeon to Guy's Hospital and the Hospital for Sick Children, London.*

(Plates I.-IV.)

Several years have now elapsed since I concluded that the enlargement of the pharyngeal tonsil, which constitutes the so-called adenoids, is nothing but a swelling of a lymphatic tissue or gland secondary to an infection of the mucous membrane of the naso-pharynx, and that the mere partial removal of this inflamed adenoid material alone is an imperfect and unscientific treatment, since it deals only with an effect and not with the primary source of infection.

I also recognised that this naso-pharyngeal sequence, if I might so call it, was but one manifestation of a general condition, since it occurred in children possessed of comparatively little vitality, because of a deficiency in their respiratory capacity. I therefore decided to attack the primary source of infection of the mucous membrane with the secondary infection of the lymphatic masses in the pharynx, fauces, and neck, together with the imperfect development of the naso-pharynx, etc. This deficiency exists because the forced draught through this cavity upon which its normal development depends is in abeyance. I did this by improving the respiratory capacity, and consequently the vitality of the patient, by regular breathing exercises, insuring the passage of the whole of the inspired and expired air through the naso-pharynx only.

This treatment, when carried out systematically, has met with complete success; so much so, that for a long time I have been obliged to perform this operation on the pharyngeal tonsil but very occasionally in private practice. On the other hand, I have seen a large number of cases treated without operation with complete success, whose parents were informed by well-known authorities that operative interference was absolutely necessary. I do not wish to convey to you that under no circumstances is the operation necessary or advisable as an adjunct to other treatment, but that it is not an operation to be undertaken systematically on any patient in which the condition is diagnosed. It is only in a very small proportion of cases that it is required in order to establish a through way, or to telescope the duration of treatment. This I will refer to again later.

Take some of those children who suffer from the presence of these so-called adenoids, and let us observe them carefully. As they stand, they assume the "symmetrical posture of rest," which is shown very well in Plates I.–III.

The chest is flattened in front, depressed, and the abdomen is thrown forward, the dorsal spine is flexed, the shoulders project forwards, and the lower angles of the scapulæ are prominent on the back of the chest. To this condition the term "dorsal excurvation" is applied by the profession, and "round shoulders" by the public. If the child is standing at rest on one leg, the trunk assumes the position I described as the "asymmetrical resting posture." This, from its habitual assumption, may have become fixed and later exaggerated. By the profession this is described as "scoliosis" or "lateral curvature," while the public, being most struck with the prominence of the right scapula, regard it as "growing out of the shoulder." It may be fixed or exaggerated, if the period during which it has been assumed is of sufficiently long duration. Respiration is superficial, rapid, and entirely diaphragmatic. A tape encircling the chest at the level of the nipple shows probably no variation whatever during ordinary inspiration and expiration. If the patient is told to breathe as deeply as possible, the measurement of the chest is increased to a varying degree above that point, but it returns to it in expiration, the normal position being that of almost complete expiration. The skin of the chest is opaque and white, and is marked by large prominent veins gorged with blood. On looking at the back, the skin is seen to be covered over a varying area by a fine down, which extends beyond the middle line, and becomes continuous above with the hair of the scalp. Again, the feet are retained in a position of abduction, including between their inner margins a considerable angle. This position of the foot may after a time become fixed, and later exaggerated. This I showed to be merely the assumption of the "position of rest" of the foot or of abduction, but by the profession and public it is spoken of as "flat foot." By the former it is considered to be due to the yielding of ligaments supporting arches, because they are unaware of the normal mechanics of the foot, which resembles an arch in no particular. Knock-knee, or a diminution of the external femoro-tibial angle, is not unfrequently seen in a slight degree, due to the habitual assumption of the resting erect posture, whether symmetrical or asymmetrical, but especially the latter. During the time the position is being assumed the entire superjacent weight falls outside the knee-joint, so that the outer part of the epiphysial line is exposed constantly to a much greater pressure than that sustained by the inner segment. In consequence, a correspondingly smaller amount of bone is formed by the outer part than by the inner, the femoro-tibial angle decreasing proportionately. This general law I formulated in the following words:—"The several parts of a growing line form bone at a rate inversely proportionate to the pressure they transmit."

The head is thrown forward because of the flexion of the dorsal spine, which is of necessity associated with expiration, flexion and extension of the spinal column being, as I explained, the most conspicuous of the thoracic respiratory processes, and produced chiefly by the action of the intercostal muscles, the internal being the most powerful but indirect extensors of the dorsal spine, and the external the most powerful flexors. They exert their action upon the vertebræ through the ribs. Those muscles are associated in their action with such portions of the internal and external abdominal oblique, the fibres of which continue their directions.

The mouth is open, and more or less of the upper incisor teeth are seen. The nose immediately above the lower lateral cartilages is compressed laterally, and little or no movement can be observed in the anterior nares during respiration. On either side of the nose the face below the orbit is hollowed, the normal rounded prominence of the part being wanting. The width of the face forming the cheeks is abnormally little. Looking into the mouth, you notice that the alveolar arch is compressed laterally, and that the palate is very high along its central part. Indeed, the height of the palate bears a direct proportion to the changes just mentioned in the nose and face, or, in other words, the development of the nose varies inversely with the height of the palate and with the breadth of the alveolar arches. The width of the alveolar arch of the lower jaws bears a direct relation to that of the upper, upon which it is moulded in its development. The faucial tonsils are probably large, as are also the pharyngeal tonsils. There may be a variable amount of deafness owing to imperfect aeration of the middle ear or to obstruction to the exit of mucus from it. I pointed out that *the only mechanical factor upon which the naso-pharynx has to depend for its development is the pressure exerted on it by the forcible passage of air through it during the respiratory process, and that the development of the superior maxilla, malar bones, and lower jaw, varies of necessity directly with that of the naso-pharynx.* Owing to its deficient vitality, the child catches cold readily. The trouble starts in the naso-pharynx, and may extend to the larynx, trachea, and bronchial tubes. There is often a chronic snuffly cold in the head, with perhaps some irritation of the anterior nares. The muscles of such children are usually soft and flaccid, and their intelligence is a variable factor. Sometimes they are considered dull and stupid, while at others, on the contrary, they are said to be intelligent. This, I take it, varies with the state of the nutrition of the brain, and the variety of the demands made upon it. If the child uses up its limited brain power in muscular exertion, its capacity to make intellectual effort is small, while if the same energy is employed intellectually, under pressure, that to spare for the muscles is correspondingly small.

Now, it is clear that every child that is suffering from adenoids does not exhibit all these evidences of a peculiar mechanical relationship to its surroundings described here, but *they all show that the process of aeration of the blood is carried out very imperfectly, and, in consequence, the blood is not oxygenated in a satisfactory manner.* Respiration is diaphragmatic, while thoracic respiration is completely neglected. Diaphragmatic respiration is a more perfect reflex than thoracic respiration, and requires much less effort for its performance. For this reason it is, as you are all aware, employed alone, to the practical exclusion of thoracic breathing by feeble subjects, both young and old. Because of a deficient supply of oxygen, the child, therefore, has not enough energy to carry on the work of its muscles, its brain, or the other tissues of its body, nor to protect itself from the power that organisms have of obtaining a foothold on tissues whose vitality is lowered by injury of some sort. In the young subject the mucous membrane of the nasal cavity is that which, from local depreciation by cold, becomes invaded most readily by organisms which, having secured themselves there, manifest their occupation by symptoms which are popularly comprised under the term cold in the head. As the result of their presence, the nasal cavity, with those which communicate with it, becomes more or less completely blocked by the swelling of a very vascular mucous membrane and by the inflammatory secretion poured out from its surface. The lymphatic tissues in the vicinity become secondarily inflamed. These exist as irregular masses in the wall of the upper part of the pharynx, and were described as the "pharyngeal tonsil." Whenever they have become at all enlarged, however slightly, in consequence of the infective process in the mucous membrane, with which they are associated, they are dignified by the dread and unmeaning name of adenoids. What a misfortune it was when this name of adenoids was applied to this collection of inflamed lymphatic tissue, subsequent generations will recognise with amusement; but for the time, at all events, they have served to popularise an operation which everyone who has a ring knife or even a long finger-nail believes himself capable of performing sufficiently skilfully. You all know how this operation has been modified by time. At first a small piece was picked out by biting forceps, without an anæsthetic, this process being repeated at intervals as frequently as the patience and the income of the sufferers allowed For some considerable time now the removal has been effected at a single sitting under an anæsthetic.

The faucial tonsil often becomes inflamed, in consequence of septic absorption, as do later the lymphatic glands in the neck which receive the lymph supply from the masses above them.

These enlarged cervical glands, whose vitality is depreciated by this septic process, readily become colonised by tubercular organisms, which are supplied *ad libitum* in the uncooked tubercular milk with which children are almost universally fed. If a vigorous child becomes affected by a cold in the head, he never rests till he has cured himself by the forcible and free ventilation of the naso-pharynx, by powerful inspiratory and expiratory efforts. In other words, he blows his nose and snuffles vigorously till he has restored the inflamed mucous membrane to its normal condition. The feeble child does not do this, but is satisfied to obtain the small portion of oxygen which he requires by keeping the mouth open.

The organisms continue to thrive under these circumstances which are most favourable to them, as opposed to the individual; and the conditions dependent on their presence continue to increase, depreciating still more the vitality of the sufferer.

From the consideration of these facts the indications for the treatment of these patients seems to me to be clearly as follows :—

First, we must endeavour to increase the vital capacity of the sufferers by teaching them how to breathe properly and efficiently. To do this, the demand on the expenditure of energy should at first be reduced to the minimum requisite to fill and empty the chest to its utmost, avoiding any exercise of the muscles which does not bear directly in bringing this about. In this manner as much energy as possible is accumulated, at a minimum of cost to the total energy or capacity for work of the individual. To make these children perform systematic exercises, for purposes other than increasing the respiratory capacity, is a most expensive procedure, and quite beyond that permissible by the amount of their usual income of energy.

By getting them to breathe freely, you supply them with a large quantity of oxygen, which enables them as a whole and their several tissues as component parts to perform their physiological functions in a more satisfactory manner. The improvement can be gauged by measuring the daily progressive differences between the measurements in extreme inspiration and extreme expiration. Of course the air breathed should be as good as possible, and fatty foods are most useful.

Secondly, the mouth must be kept shut habitually, and certainly during the respiratory exercises, air being driven freely and forcibly in and out through the naso-pharynx alone. If any mucus exists in the nasal passages, it must be cleared by blowing the nose vigorously. In this manner you remove the nasal catarrh and the irritation and hypertrophy of the lymphatic tissues in the pharynx, and increase the lumen of the naso-pharynx with the structures directly dependent on its development from theirs.

As the respiratory capacity improves, so the child obtains energy to spare, and it becomes more active in the full enjoyment of life. If this treatment is adopted under favourable circumstances, the single link in the sequence, namely, the enlargement of the lymphatic tissues in the upper part of the pharynx, will disappear, and the so-called adenoids will no longer exist, since I presume the term cannot reasonably be applied to the structure in its normal condition, but only in its inflamed state. Some authorities seem to differ as to how much lymphatic tissue the patient is justified in retaining without its being dubbed "adenoids," and urgently calling for its removal. The only circumstances under which I can understand the surgeon being warranted in attacking the pharyngeal tonsil are—(1) When the condition has been so thoroughly neglected that the child is unable to drive air through the naso-pharynx, whose development has been long in abeyance, until the enlarged pharyngeal tonsil has been effectually removed; (2) when for some reason or another, such as considerable difficulty in forcing air through the nose, ear trouble, important school or other engagements, peculiar circumstances, etc., it is necessary or advisable to telescope the duration of the treatment; and (3) when the child is too young to do what it is told. In private practice the first condition should not exist, and it only exists because medical men pay absolutely no attention to the manner in which the child performs by far its most important function, namely, respiration, by means of which the oxygen, the prime factor of life, is distributed to the several tissues in the body. Many inquiries will be made as to the manner in which the intestines perform their functions, and if, because of an imperfect supply of oxygen and owing to the constant assumption of sedentary and resting habits, these viscera are not fit to perform the work they should do in a healthy subject, they are stimulated in an unnatural manner by drugs. Let medical men treat their patients in a common-sense manner, regarding them simply as machines, recognising that they bear only a mechanical relationship to their surroundings, and we will soon observe a rapid improvement in their physique. All such conditions consequent on imperfect development of the naso-pharynx, the constant assumption of resting postures, and any number of troubles associated with and produced by them, will disappear. When difficulty is experienced in inducing the patient to pursue such respiratory exercises as increase the vital capacity, it is well to place a trained nurse in charge, when progress is generally rapidly made even in very young children. We should look upon the operation as removing one effect only of a general condition, and not a radical measure.

The consideration and recognition of the mechanical factor that determines the development of the naso-pharynx, and indeed of the whole face, led me to operate on children affected with cleft palate at a very early age, usually during the fourth week, if the condition of the child be satisfactory, and to close the aperture in the palate before the cleft in the lip, should it be present also. I was able to do this with facility and accuracy, and with very little risk to life, by the use of minute, sharp, straight, and curved needles. I found that the operation was performed with much more ease at this period of life than at the age at which the operation had been previously undertaken, since the loss of blood was very small, because of the very minute size of the blood vessels. The infant also sustains a relatively less shock, usually taking its food with satisfaction very soon after the operation.

As I tapped a perfectly new source, I was inundated with material, the mothers being delighted to have the deformity removed as early in life as possible. It now seems to me almost impossible to look back to the time when one used to close clefts in the palate in children of 3 years old and upwards with large clumsy needles of various shapes attached to long handles, and called cleft palate needles. I may remind you that the age which surgeons consider suitable for operation is between 3 and 6 years, as you will see if you look the subject up in the most recent text-books. The use of the minute needle demands good eyesight, and a moderate amount of dexterity.

Passing on to the consideration of fractures, you may remember that it is now several years since I showed that the accepted teaching on the subject of the mechanics and treatment of fractures was incorrect, and founded on no scientific basis whatever. This view met at first with almost universal opposition, while the accuracy of my statements was called in question. Fortunately the advent of the X-rays two or three years later furnished me with undeniable evidence, that could be applied to any and every case.

Briefly I demonstrated—

1. That the supposition that the surgeon is able to restore the broken bone to its normal form, or, as it is termed, to set the fracture by manipulation, etc., and to retain it in position by splints and other means, is, except in a few cases of transverse fracture, quite wrong.

2. That muscular contraction exerts practically no influence in opposing restoration of the broken bone to its original form.

3. That the whole of the soft parts surrounding the bone, whether muscles, skin, or fascia, act as ties in its length, and that the hæmorrhage into and beneath these ties, with the inflamma-

tion consequent on it, are the mechanical factors which prevent accurate apposition of its fragments.

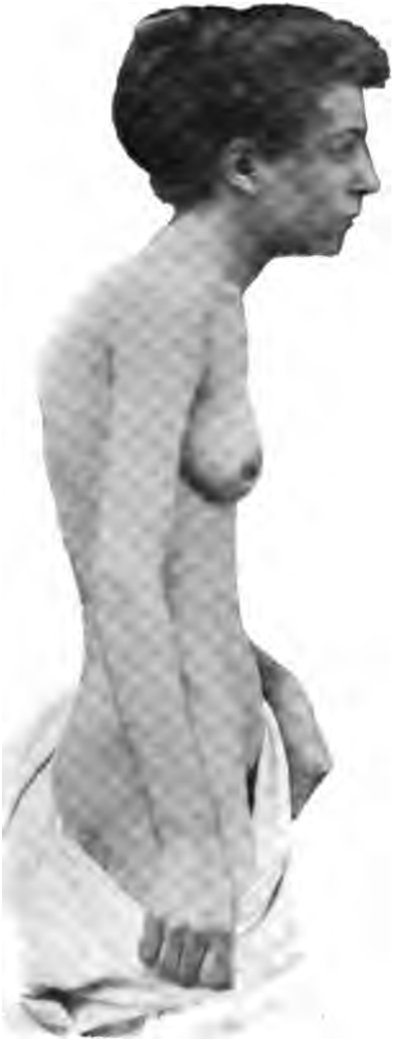
4. That the only manner in which the bone can be restored to its original form is by an operation. When the fracture has been exposed, it is possible, by the exercise of great traction upon the fragments, assisted by powerful lion forceps and elevators, to fit them accurately together. The difficulty in doing this is very much greater in the case of the lower extremity than in that of the upper; indeed, there are few operations which are more difficult than the restoration in form of the tibia and fibula, broken by indirect violence. In this variety of fracture the bones are broken so as to form a spiral, with sharp angles upwards and downwards. It is the very great difficulty that surrounds the operation in this particular locality that will always stand in the way of its general application.

A complication of considerable importance is that of comminution of the ends of the fragments. It often adds largely to the difficulties that surround surgical interference, and will sometimes tax your ingenuity to the utmost.

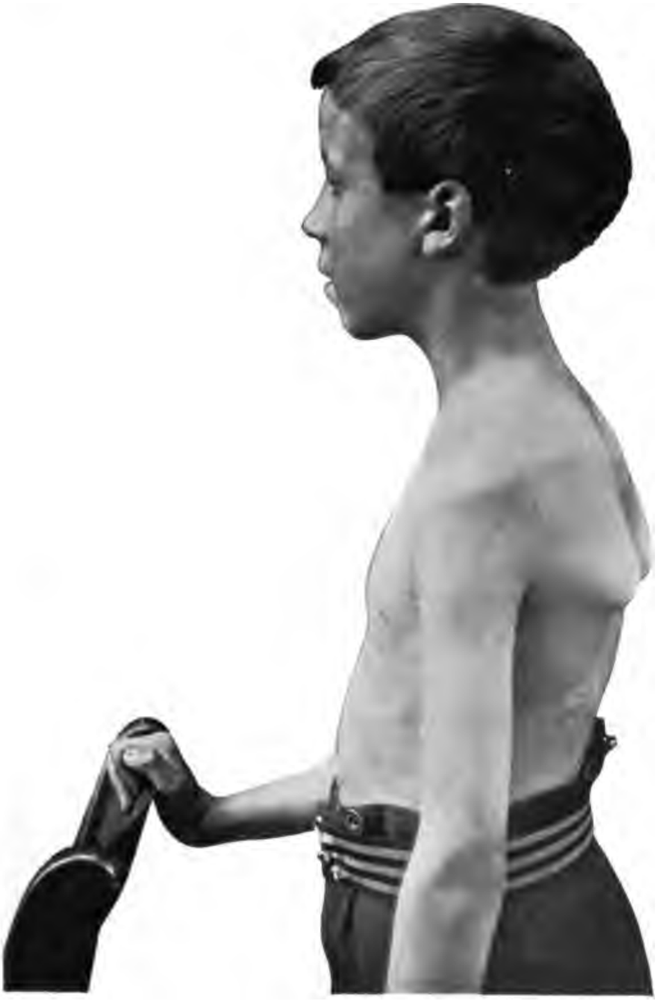
You can generally fasten the perforated fragments to the shaft and to one another with silver wire, while sometimes a loop encircling the fragment and shaft may be of more service. These are, however, details. What I learnt from this particular complication was, that one could utilise fragments of bone which were quite loose in the wound, providing they were secured firmly in position. This led me to employ the bones of other animals in these and similar conditions, when additional support was required. I found that it was necessary to fix such bones sufficiently firmly to prevent any movement, in order to insure their living.

The next subject that will claim our consideration is an operative procedure that I devised to meet the condition called congenital dorsal dislocation of the hip-joint, in which the flattened, ill-developed head of the femur plays loosely over the flat surface of the dorsum ilii, the superjacent weight of the trunk being transmitted only through the ligaments of the hip-joint; also, in cases of hip-joint disease, in which the thigh has become fixed in a position of flexion and adduction, so that it is impossible to bring the leg into a position of extension, and parallel to its fellow. Again, the same mechanical procedure is equally efficient in a still more advanced condition of the same disease, when the head of the bone, or what remains of it, has been displaced upwards and backwards on to the dorsum ilii, the thigh being in a position of considerable flexion and adduction, one of great mechanical disability. Added to this, there is also very great deformity of the trunk during locomotion.

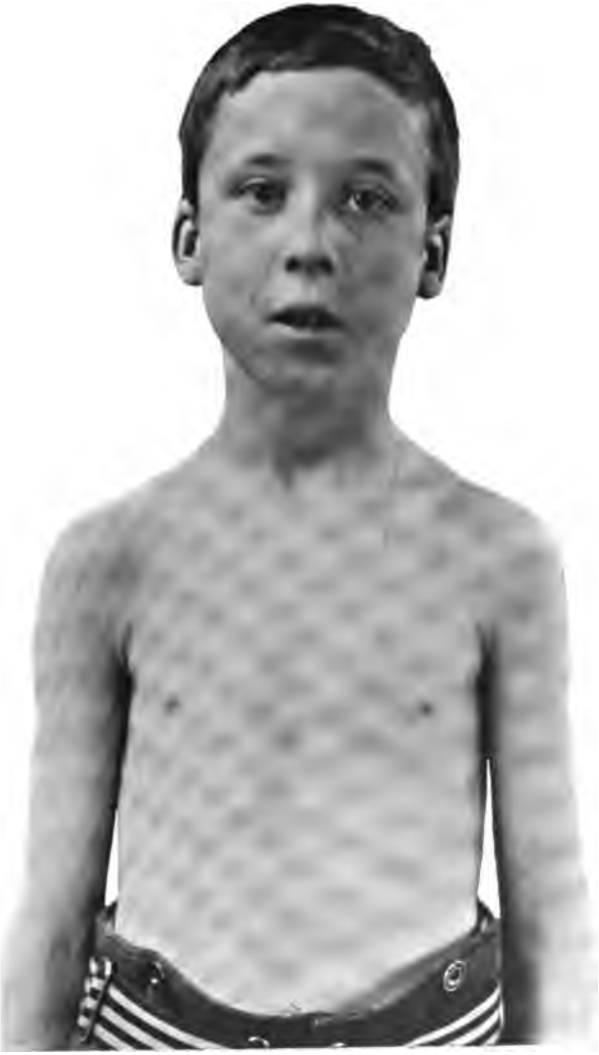
The principle which guides one in interfering is to replace these several conditions by a secure joint, allowing of a considerable amount of flexion, adduction, and abduction, which is situated



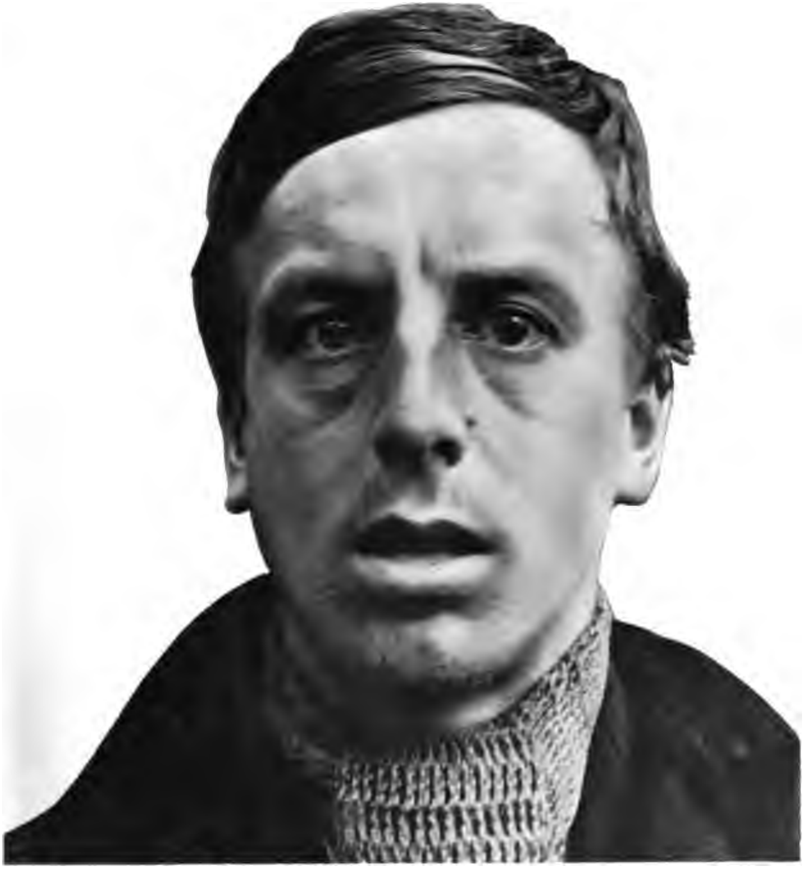
Girl about 15 years of age. The condition of the trunk is very marked, but that of the face is not shown so well in profile.



Similar condition in a boy.



Facial deformity in greater detail.



Same condition in an adult. This man consulted me because of the very imperfect nature of his articulation, produced by the undeveloped state of the naso-pharynx. I thought of removing the bony roof of the mouth, bringing down the muco-periosteal covering of its under surface so as to increase the naso-pharyngeal area. By the use of a plate I could readily assure the soft roof from injury. I was, however, deterred by his having frequent epileptic fits, and refused to interfere in spite of his constant pleadings for operative treatment.

in front of the transverse axis, around which the pelvis rotates, so that compensating for the shortening does not diminish the physical capacity of the individual, while the condition of general over-extension, comprised under the indefinite term lordosis, can be completely removed by compensating for the shortening. It is unfortunate that a new joint can only be developed with any certainty and efficiency in the young subject practically under 10 or 12 years of age, also that the operative procedure requires a certain amount of skill for its performance. The subsequent treatment of the case calls for much care, attention, and patience for many months after the operation, till a thorough, complete, and efficient joint has been evolved.

The method I adopt to secure the above end is as follows:—The muscles above the level of the great trochanter are divided transversely, and the upper end of the femur is freely exposed and cleared from the soft parts. A cavity is cut in the ilium, immediately beneath the anterior inferior spinous process, and a hole is drilled through its floor. The head of the femur, or, if that has been destroyed, the stump of the neck, is trimmed up with a file, till it forms a convexity of a form adapted to fit the cavity cut in the ilium. A hole is made with a drill through the upper end of the femur, so as to traverse the neck of the bone, and emerge from the summit of the convexity which has been formed. A piece of stout silver wire is passed through the hole in the femur, and through that in the floor of the acetabulum. The wire is carried across the front of the femur, and its ends are knotted securely on the outer aspect of the trochanter, so as to be readily exposed later. The ligaments and muscles are brought together by wire sutures as carefully as possible, and the wound is closed. After an interval of about ten days or a fortnight, movements of flexion are commenced, their range being increased daily. Movement is practised systematically in this manner for an increasing period of time for about two or three months, till an arthrodial joint has been thoroughly developed, and a strong capsular ligament has been formed. The knot in the wire loop is then exposed, and the wire is cut through, and pulled out by exerting firm traction upon it. Movements of adduction and abduction are combined with those of flexion, and, after a time, that of rotation is superadded. In about six months or so, a very excellent joint is formed, permitting all the movements which exist in the normal hip-joint in a greater or less degree. Another six months must be allowed to elapse before the patient is permitted to use the limb for the purpose of locomotion, and the duration of this period should be still further increased, if the operation has been performed on both sides.

Nothing can have been more satisfactory than many of the results that I have obtained by this method. It is often advisable, when operating for acute tubercular disease of the hip-joint, of considerable extent, to be satisfied with the removal of the disease first, further operative measures being postponed till a later period. If this is not done, the movement of the bones on one another may produce sufficient irritation to provide a nidus for the growth of tubercular organisms, and the wire itself may serve as a source of irritation under such circumstances. I have, however, not adhered very closely to this rule, and have not unfrequently attacked extensive disease of the hip-joint, and made a new joint with success at a single sitting.

THE RELATION OF TYPHOID FEVER TO DISEASES OF THE GALL BLADDER, WITH A REFERENCE TO THE BACTERIAL ORIGIN OF GALL STONES.

By A. W. MAYO ROBSON, F.R.C.S., *Senior Surgeon, Leeds General Infirmary*; *Emeritus Professor of Surgery, Yorkshire College, Leeds.*

THE view is gradually gaining ground that biliary calculi have for the most part a bacterial origin, and that, although there are other causes, they are usually predisposing only. For instance, foreign bodies have been introduced into the gall bladder of animals, under antiseptic precautions, and gall stones have not resulted, though, if the foreign body was placed in the gall bladder along with attenuated organisms, biliary calculi were formed in time around them. The organisms principally concerned are either the *Bacterium coli commune* or the typhoid bacillus.

Bernheim in 1880 was apparently the first observer to draw attention to the connection between typhoid fever and gall stones, and the further clinical observations of Drs. Murchison and Hale White have confirmed these views, as they discovered evidences of inflammation and ulceration in the gall bladder in well-marked and fatal cases of enteric fever, there being no obstruction to the passage of bile or other cause than the specific disease to account for the trouble.

Chiari[1] investigated systematically a series of twenty-two cases of typhoid fever. With the exception of three cases—one in the infiltrating, and two in the necrotic stage—he obtained typhoid bacilli invariably out of the gall bladder, and in fifteen cases they were obtained in pure culture. They were generally present in considerable numbers. In thirteen of the nineteen cases in which a positive result was obtained, there was inflammation of the gall bladder with small-celled infiltration, œdema, and hyperæmia.

In all the twenty-two cases the diagnosis of typhoid fever was confirmed by cultivations from the spleen, mesenteric glands, or liver, or from the larger bile ducts.

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[1] *Ztschr. f. Heilk.*, Berlin, Bd. xv. S. 199.

Gilbert and Girode[1] found typhoid bacilli in the pus from a case of empyema of the gall bladder, which came on as a sequence of enteric fever. Gilbert and Dominici[2] also assert that they produced suppuration in the gall bladder and liver of rabbits by injecting a culture of typhoid bacilli into the common duct.

In the *Lancet*, London, 2nd March 1895, a case is reported by Marmaduke Sheild, which was doubtless a case of phlegmonous cholecystitis, following on typhoid fever, in a woman, æt. 31.

No. 2806 in the Hunterian Museum is a case of typhoid cholecystitis, probably phlegmonous, as the peritoneal coat has much false membrane on it, and pus was found in the gall bladder. It is from a case of typhoid fever, and death occurred in the fourth week.

Typhoid fever furnishes the museums with several specimens of infective cholangitis and cholecystitis.

No. 1395 in Guy's Museum is a specimen of Dr. Hale White's, and shows inflammation of the bile passages and cholecystitis without any obstruction in the ducts. Death occurred in the seventh week.

No. 1594A in the Middlesex Museum shows inflammation and ulceration of the bile passages in typhoid fever.

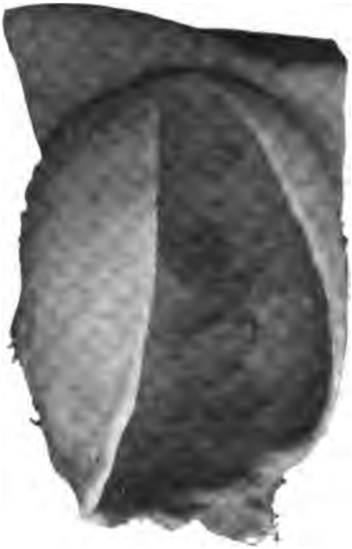

FIG. 1.

Blackstein in 1891 noticed the constant occurrence of typhoid bacilli in the gall bladder of rabbits after experimental inoculations, and later Professor Welch discovered that they persisted in the gall bladder long after disappearing from other organs; in one case they were found 128 days after inoculation (Cushing).

In the *New York Med. Journ.*, 28th January 1899, is related a remarkable case of acute cholecystitis, due to typhoid, where the primary pain was in the gall bladder, and where, after operation for the relief of the gall bladder trouble, the patient passed through a typical course of typhoid fever.

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[1] *Compt. rend. Soc. de biol.*, Paris, 2nd December 1893.
[2] *Ibid.*, 23rd December 1893.

In Professor Halsted's clinic, about one-third of his cases operated on for gall stones gave a history of typhoid fever at intervals of from a few months to several years.

I have noted the previous history of typhoid in many of my operations for gall stones, and in some the relations between the two seemed very direct.

With regard to other organisms. In 1886, microbes were found in biliary calculi by M. Galippe. Gilbert, Dominici, and Fournier examined calculi from seventy cases, and found the *B. coli communis* either living or dead in one-third of the cases.

They have performed a number of experiments[1] on animals, which seem to show that not only do the *B. coli communis* and the typhoid bacillus set up a cholecystitis, but that this tends to the formation of gall stones. In two cases they succeeded in inducing the formation of perfect calculi in a dog and rabbit infected with the *B. coli communis.*

Mignot[2] has not only confirmed these results, but has gone further. He succeeded in producing typical calculi in guinea-pigs, and obtained the following results:—(1) Foreign bodies when introduced into the gall bladder can stay there for an indefinite time, provided they are aseptic, without causing inflammation or precipitating the solids from the bile. (2) Foreign bodies, previously impregnated with virulent micro-organisms, cause a more or less intense cholecystitis, and precipitate the solids from the bile. As long as the bacteria retain their virulence, however, they cannot form a calculus, but only a sediment mixed with pus. This precipitate has no tendency to cohere or adhere to foreign bodies. (3) Mignot then shows why previous attempts to form calculi have failed.

The bacteria must be attenuated, not virulent. This is best attained by growing them for some months in bile, to which constantly decreasing amounts of broth are added. When sufficiently attenuated, they are no longer pathogenic when injected into the cellular tissue of animals. By injecting these into the gall bladder, stones are occasionally formed, but more often the bacteria are washed out into the intestine. If, however, a foreign body, especially if porous, such as cotton-wool, be placed in the bladder and fixed to its wall to prevent expulsion, a stone is formed round it with the greatest certainty. Five or six months are required for the formation of perfect calculi. The kind of bacteria injected seems to be of quite secondary importance.

Mignot has proved that the typhoid bacillus, the *B. coli communis*, staphylococci, streptococci, and even the non-pathogenic *B. subtilis*, are capable of giving rise to calculi, and probably a great number of other organisms are equally potent.

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[1] *Arch. gén. de méd.*, Paris, September 1898.

[2] *Ibid.*, Paris, August 1898; and *Brit. Med. Journ.*, London, Suppl., 3rd December 1898.

The history of typhoid fever may be long antecedent to the symptom of cholelithiasis, and yet the relationship may be a true cause and effect.

Case 1.—In May of this year I operated on a patient, Mrs. H., æt. 48, who gave a history of typhoid fever twenty years ago, accompanied by pain and tenderness beneath the right costal margin, and followed within the year by so-called spasms, which, with intermissions, had continued off and on for the whole intervening period. The attacks for two years before seeing me were regularly followed by slight jaundice, and accompanied by pain over the left side of the abdomen, and by vomiting, leading to great deterioration of health, and to a loss of flesh amounting to 3 stones.

When I saw her, there was tenderness at a point midway between the ninth costal cartilage and the umbilicus, which I have found to be almost as significant of inflammatory trouble about the gall bladder as M'Burney's point is of appendicitis. This sign, together with slight icterus after each attack, led me to diagnose gall stones, although the pain of late had been more especially on the left side of the abdomen.

The left-sided pain in cholelithiasis, I pointed out some years ago, is always associated with adhesions between the pylorus and gall bladder or ducts, and from this and other similar cases it almost seems as if, when this event occurs, a transference of the pain took place from the right to the left side, as in reflected pains in other parts of the body.

There was also well-marked dilatation of the stomach, showing that the visceral adhesions were producing a difficulty in the passage of food into the duodenum. At the operation I found the diagnosis confirmed in every particular, and after removing forty-six gall stones from the cystic duct, one of them projecting into the common duct, and detaching adhesions of the pylorus, I drained the gall bladder.

Recovery was uninterrupted, and the patient is now well in every respect. There has been no pain since and no vomiting, digestion is perfect, and her lost weight has been regained.

In the following case the relationship was still more distinct:—

Case 2.—Mrs. L. S., æt. 36, was admitted to the Leeds Infirmary on 18th September 1897, with intestinal obstruction of a week's duration, which was relieved by ¼-gr. doses of extract of belladonna and the use of enemata. She gave the history that she had been perfectly well up to March of that year, when she had a severe attack of typhoid fever, which had been followed by steadily increasing constipation and the discharge of small motions, accompanied by a little blood and mucus. The patient being so much better, under medical treatment, was discharged on 9th October, but had to be readmitted on 12th November, on account of a return of the obstruction with which she has been threatened on several occasions during the intervening month which she had spent at home under the care of her own medical man.

On admission the abdomen was distended, and there was distinct tenderness in the right hypochondriac region. Though the symptoms were not so acute as when she was in the hospital before, it was decided to open the abdomen, in order to discover, and, if possible, to remove the cause of the obstruction.

The operation was performed on 18th November, through a median incision, when the transverse colon was found to be contracted along its whole course, to the size of the middle finger. The ascending colon and the small intestine were much distended, and when they were held aside, two bands were found passing from the gall bladder quite across the hepatic flexure of the colon, one of them completely encircling it. On division of these, the manifest cause of the obstruction was removed, and the transverse colon immediately became distended. The abdomen was then closed. The bowels were opened the day after operation, and the patient was discharged on 14th December, the wound having healed, and the bowels being opened every day without aperient or artificial help.

In these cases the symptoms of gall bladder trouble seemed clearly to date from the attack of typhoid fever, and though twenty years intervened between the operation and the fever in the first case, the gall bladder troubles began soon after the illness in question, and continued with intermission up to the removal of the gall stones.

In the second case, the connection between the fever and the cholecystitis seems to be very clear; and it was probably only owing to the ducts being free that the more serious trouble of phlegmonous cholecystitis did not supervene at the time of the attack of typhoid, for the inflammation of the walls of the gall bladder must have been very severe to have extended to the peritoneal coat, and led to the pouring out of so much lymph as the firm adhesions demonstrated.

In conclusion, the evidences, both experimental and clinical, of the relationship between enteric fever and gall bladder trouble leave no room for doubt that the gall bladder is a favourite site for the growth of the typhoid bacillus, and that the gall bladder region ought never to be ignored during or subsequent to an attack of typhoid fever.

MEDICO-LEGAL NOTES.

By Harvey Littlejohn, M.A., B.Sc., M.B., F.R.C.S.Ed., *Lecturer on Medical Jurisprudence, Surgeons' Hall, Edinburgh.*

II.—On Suicide.

The subject of suicide is one of considerable importance from a medico-legal point of view, and has been fully dealt with in its various phases by several writers both in this country and abroad. From collective statistics, embracing many years and various nationalities, it has been possible to deduce certain laws to which it has been shown suicide conforms with almost exact regularity. It is thus possible to foretell the time of year when the largest number of cases will occur, with the number of each sex and the methods which will be employed, and even to predict with approximate accuracy the number of suicides which may be expected in any country each year. While, therefore, suicide is popularly considered to be a purely voluntary act, dependent wholly upon the individual, the investigations of statisticians are able to show, on the other hand, that it is governed by definite laws, and that, however voluntary the act may appear, in every population a certain number of lives must annually be terminated by suicide. Dr. Ogle,[1] dealing with the statistics of suicide in England and Wales during the years 1858–1883, and speaking of the chances of anyone committing suicide, writes: "The total chance of dying by suicide is much more considerable than would probably be supposed by anyone who had not examined the question; few, for instance, would imagine that one out of every 119 young men who reach the age of 20 dies ultimately by his own hand. Yet such is the case." This chance is calculated for the entire population, and as we know that in certain occupations suicide is much more frequent than among the general population, if this chance had been calculated for certain selected occupations or for the educated classes separately, the above number would be considerably greater.

If, however, suicide when viewed in the light of large masses of statistics has enabled us to recognise many general rules applicable to its occurrence throughout the country as a whole, yet the statistics of each separate community, which go to make up the total, naturally show variations from the general rule, as, for example, in regard to the proportion of the sexes, the time of the year chosen, and the methods employed, which may often be accounted for by special local circumstances.

Local statistics of suicide, therefore, present features of interest, and deserve to be recorded both as a contribution towards the sociology of the community as well as on account of the many questions of medico-legal interest which a detailed examination helps to throw light upon.

It is admitted that statistics of suicide founded upon death registration returns are liable to be inaccurate, owing to the feeling which exists in most families against an official acknowledgment of death having occurred through suicide. The medical attendant not unnaturally sympathises with this feeling, and frequently, wherever it is possible, consents to leave the obnoxious word out of the certificate, so that the death escapes proper classification, and the official returns are thus rendered inaccurate.

In the following record of cases of suicide which have occurred in Edinburgh during the thirteen years from 1883–1895 inclusive, I have therefore not relied upon the death returns of the Registrar-General, but have derived the figures from the official records, kept by the Criminal Investigation Department of the city, of all cases of sudden or violent death. In every case of sudden or violent death a careful report of the circumstances is drawn up by the police, and the records of these cases afford, I believe, a much more reliable and accurate method of arriving at the actual causes of death. Even by this method of investigation it is possible that a few cases of suicide may still escape being recorded, as for instance where a man is found dead in a room where there are several bottles, and where there may be no proof available that he has taken any of the contents, or even if he has, that he did so suicidally and not as a result of accident. Apart, however, from such doubtful cases, I feel confident that the statistics thus obtained are reliable, or at any rate more trustworthy, than those derived from the registered causes of death. I should add that doubtful cases of suicide, in which evidence of design was absent and accidental death possible, have not been included in the tables.

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[1] *Journ. Stat. Soc.*, vol. xliv.

During the thirteen years under consideration a total of 298 cases of suicide occurred, which gives an average of nearly twenty-three annually.

Table I.—*Suicides in Edinburgh*, 1883–1895.

	Years.													
	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.	Total.
Males .	22	17	11	13	14	17	16	12	13	14	12	18	20	199
Females	8	11	6	9	7	11	8	7	7	4	9	6	6	99
Total	30	28	17	22	21	28	24	19	20	18	21	24	26	298

The proportion of male to female suicides is usually three or four to one, a proportion which is practically constant all over Europe. From the above table, however, it will be noticed that the proportion of females is considerably greater, the ratio of male to female suicides being two to one. From a consideration of the particulars of the individual cases, I think there can be only one explanation of this excess of female suicides, namely, that it is due to intemperance. In the large majority of instances the women were addicted to drink, and there can be little question in the minds of those who are acquainted with the lower classes, both here and in other large Scottish towns, that the drinking habit amongst women has largely increased during recent years.

The *period of the year* when the suicidal tendency is most strong is a subject of much interest; and, contrary to what was formerly believed, and what one would naturally expect, it is in the spring and summer that suicide is commonest; while in winter, when the climatic conditions are worst, and therefore were thought to exercise a depressing influence upon the mental faculties, the number of suicides is as a rule the least.

The increase of suicide at the time of year when nature is most beautiful, and the general surroundings of the individual are best calculated to cheer him and render the pinch of poverty less hard to bear, is a curious fact, which is true, as a general rule, not only for town-dwellers but also for those living in the country, and for those of other nations as well as our own.

The general rule is, that the number of voluntary deaths goes on regularly increasing from the beginning of the year to June, and afterwards falls to the end of the year, the minimum occurring generally in the month of December.

The rule will be seen practically to hold good for Edinburgh, although the maximum is reached in March instead of in May, as more usually occurs. The large number of suicides in January, a time of year when they are as a rule comparatively small, is due, I believe, to the influence of the New Year, and the large amount of drunkenness and misery which its celebration entails amongst the lower classes. If we group the months according to the seasons of the year, the prominence of spring is very evident, giving ninety-three cases as compared with seventy-five in the summer, seventy-three in autumn, and sixty-four in winter.

TABLE II.

	Months.											
	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Suicides . . .	29	19	35	24	34	25	24	26	28	20	25	16
Percentage of average monthly number of cases.	116	76	140	96	136	100	96	104	112	80	100	64

The above table shows the number of cases which occurred in the various months of the year, during 1883–1895, and also the percentages which these figures represent above or below the monthly average of the whole period under discussion.

Time of day.—The period in the twenty-four hours which suicides choose to commit the act varies of course very considerably, but still, as a general rule, they show a distinct predilection for the hours of daylight, and not, as one might expect, from the usual desire of secrecy manifested by them, the hours of darkness.

In classifying the time of occurrence in the various cases, I subdivided the twenty-four hours into four periods of six hours each, with the view of bringing out as prominently as possible the periods, at all seasons of the year, of complete light and darkness, and hence, instead of starting at midday, I commence the first period at 9 A.M.; the results in those instances where the time when the act was committed could be accurately ascertained, are given in the subjoined table.

TABLE III.

Time.	Cases.	Percentage to Total Number.
9 A.M. to 3 P.M. . . .	84	29·3
3 P.M. ,, 9 ,, . . .	64	22·3
9 P.M. ,, 3 A.M. . . .	81	28·2
3 A.M. ,, 9 ,, . . .	58	20·2

The table clearly indicates the preference of the suicide for the daytime, and also controverts a view which has been put forward, that the tendency to suicide is greatest in the early hours of the morning, when the general vitality is supposed to be lowest.

Age in relation to suicide.—It is well known that no age above 5 years is exempted from affording its quota of cases of suicides; but, in this country, suicide at very early age periods of life is extremely rare. This is due probably to the more healthy outdoor lives led by young people compared with those of some other countries, the absence of a compulsory military service, and also, apparently, to a less sentimental strain in our constitutions, or a greater recuperative power after the disappointments of unrequited love.

The youngest suicide in the present series was that of a schoolboy, æt. 17, who, from some unknown motive, took a quantity of prussic acid. There were eleven others under 20 years of age, of whom seven were males and four females. The oldest suicide was a woman æt. 84; while of the six cases over 75 years, four were females.

The largest numbers naturally occur at the age periods embracing the time of life when the individual is faced with the greatest responsibilities, whether in relation to domestic life or business affairs, and thus we find that a progressive increase in suicide takes place up till the fifty-fifth year of life, after which the number decreases, although it must be kept in mind that this decrease may be more apparent than real, when we take into consideration the smaller number of lives at stake in the later age-periods.

TABLE IV.

	Ages.									
	Under 15 Years.	15-20.	20-25.	25-35.	35-45.	45-55.	55-65.	65-75.	75 and upwards.	Total.
Suicides.	...	12	19	46	72	71	52	20	6	298

Method of suicide.—In this country the methods of self-destruction employed, in order of frequency and stated as per thousand of all kinds of suicide, are as follows:[1]—

Hanging	365
Drowning	185
Cut or stab	184
Poison	99
Gunshot	48
Jump from height	25
Railway train	19
Otherwise	75
All methods	1000

The method is, however, influenced by sex. Amongst women the order is different, drowning being most common, while poisoning is also much more frequently employed than in the case of males. Gunshot injuries, and injuries from the railway, are also very uncommon amongst women, while, on the other hand, jumping from a height is proportionately more common.

As a rule the choice of method will be largely influenced by circumstances, and the ease with which the means may be obtained. Hanging is frequent, because a piece of rope is usually available even to the poorest individual, and little preparation is required, while it can be effected easily in the privacy of the dwelling-house; so also jumping from heights and drowning will be more common where the means for compassing death in these ways are easily accessible. It is interesting to note the methods which have been most commonly used in Edinburgh during the period under consideration, more especially as they show a very marked deviation from the general rule:—

TABLE V.—*Methods of Suicide.*

1. Poison—	
Laudanum	46
Morphia	4
Carbolic acid	9
A.B.C. liniment	5
Prussic acid, pot. cyanide	4
Nitric and hydrochloric acids	3
Chlorodyne	3
Carry forward,	74

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[1] Ogle, *Op. cit.*

Brought forward,	74
Chloral	2
Oxalic acid	1
Phosphorus	1
Other substances	8
TOTAL	86
2. Jump from height	58
3. Hanging	53
4. Cut or stab	42
5. Drowning	26
6. Gunshot	24
7. Railway train	8
8. Otherwise	1
TOTAL	298

From the above table it is seen that poison is by far the most frequent method employed, instead of occupying the fourth place, as in Ogle's statistics; while hanging, which in his table occupies the foremost place, is third in order in the figures under consideration.

In considering each of these methods separately, and first of all *Poison*—we are struck by the very large proportion of cases in which laudanum was used. The reason for this is the facility with which it can be obtained, and the well-known easy death which results. For a few pence a quantity amply sufficient to produce the required result can be obtained by anyone, without any apparent difficulty.

In addition to laudanum, it will be noted that morphia, chloral, and chlorodyne together accounted for nine deaths.

The relative frequency of suicide by other poisons than those already referred to, depends very largely upon local circumstances, such as their use in connection with certain trades. Thus, poisoning with corrosive acids is very uncommon in Edinburgh, though frequent in places where metals are worked. Carbolic acid has grown to be, within recent years, the most frequently used poison for suicidal purposes, so far as the returns of the Registrar-General indicate, due to its being universally employed as a domestic disinfectant after cases of infectious disease. In Edinburgh, disinfectants are not given out by the Sanitary Department, for household disinfection; and to this fact I attribute the comparatively small number of cases of suicide which have resulted from its use. A.B.C. liniment caused five deaths, and was probably employed simply because it happened to be at hand, the poison label attracting attention to its dangerous nature, and not because of any special knowledge on the part of the suicide of its extremely poisonous properties and suitability for the purpose. Prussic acid was used in three cases, all males, one being a medical student, one a schoolboy, and the third a coal-dealer; while another man, a typefounder, took cyanide of potassium.

Oxalic acid, which formerly was a comparatively common poison, is now rarely used, as the fact of its only once having caused death, suicidally, during thirteen years indicates.

Of the total eighty-six deaths from poison, the males numbered fifty-three, and the females thirty-three; that is to say, 26·6 per cent. of all male suicides chose poison, as compared with 33 per cent. amongst the women.

Jump from height.—This form of suicide is abnormally frequent in Edinburgh as compared with other towns, a fact which no doubt is due to the facilities which Edinburgh affords, by reason of its high tenement dwellings, and also, it must be added, through the temptation offered by the Dean Bridge, which for years has enjoyed a unique popularity in this respect.

We know that imitation influences the choice, not only of the mode of suicide, but also of the site where the act is committed, and that when a certain cliff, or monument, or bridge has been the scene of a suicide, other persons repeat the act in the same locality, and also carry the imitation so far as to endeavour to precipitate themselves from exactly the same spot. The reputation which the Dean Bridge has acquired is largely due to this cause, and also to the certainty with which it is known to effect its purpose.

In 1883 three suicides occurred from the Dean Bridge within a month, while within the same period three other cases of precipitation took place, namely, one from a window, one from Samson's Ribs, and one from the North Bridge.

During four consecutive years no cases of suicide from the Dean Bridge are recorded, but in other years when one occurred it was almost always succeeded shortly afterwards by others.

In all, eighteen suicides from this bridge have taken place during the years under discussion.

With the exception of these cases, and the two referred to above, from the North Bridge and Samson's Ribs, all the remaining cases of death by precipitation, thirty-eight in number, were from the windows of dwelling-houses. Women showed a much greater preference for this method than males, the former numbering twenty-eight, and the latter thirty, or a percentage of 28 and 15 respectively, of the total suicides in each sex.

Hanging.—Of the fifty-three deaths by hanging, forty were males, and thirteen females, which shows a special tendency of males to adopt this method.

Some unusual positions of the body were noted in several instances. In one the rope was attached to the bedpost at a height of five feet from the ground, while the body of the man was lying fully extended upon the floor, only the head and shoulders being raised a few inches from it.

In two cases the persons were sitting upon the floor, the rope being attached to a small projecting snib on a door about three feet from the floor in one instance, while in the other the man was found sitting erect beside a bed, his woollen scarf being tied round his neck and to the iron bedstead, at a height of not more than two feet above the floor level. This latter case might perhaps be more correctly described as one of strangulation.

A most unusual method of hanging or strangulation was one adopted by a man, who attached one end of a piece of rope, sixteen feet in length, to the top of a bedpost. He then passed the rope three times round his neck and afterwards wound the free end round his right arm. While adjusting the rope in this manner he must have been sitting upon the bed and then attempted to throw himself off it, since, when the body was found, the legs and buttocks rested upon the bed, while his trunk was swinging free at the side of the bed and supported in a horizontal position by the rope which encircled his neck.

Cut and stab is the next method in order of frequency, and of the forty-two deaths so caused, forty were cases of cut throat; the remaining two deaths, both males, being in one instance due to a stab in the abdomen, and in the other to division of the structures in the front of the left arm immediately above the elbow-joint.

Cut throat has always been a favourite method of suicide in this country, especially amongst males, although it is by no means unfrequently employed by females, and out of the forty cases above mentioned ten were females.

An examination of the wounds produced in these cases shows the greatest variations as regards the structures implicated and the position of the wound, so that the description of the suicidal as distinguished from the homicidal wound, given in many text-books of forensic medicine, must be received with great caution, and too much weight must not be attached to the evidence which the position of the wound appears to afford. As an example of this, I may mention that in two consecutive cases of suicide by cut throat, which I had the opportunity of examining, the wound was situated below the cricoid cartilage, and in both the trachea was almost completely divided in *two* places. It is worthy of note that the act can be very quietly performed without exciting the attention even of persons in the same room. The person whose throat has been cut makes no sound, a point of importance in cases of homicidal injuries of this nature. One instance corroborative of this was that of a man who cut his throat in a small room in which his wife was sewing, without her being aware of the fact; while in two other cases wives awoke in the morning to find their husbands, who were occupying the same bed, dead, with deep wounds in the throat.

Drowning. — Fifteen females and eleven males committed suicide by means of drowning—the favourite locality being the Canal, and, for those living in the east end of the town, Duddingston and Dunsappie Lochs. With two exceptions, all the cases of drowning occurred in one or other of these places; and while it has been supposed that suicidal drowning is more frequent during the warmer months of the year, this was not so in the cases under review, December and November affording as many suicides by drowning as any of the other months of the year. The two exceptions regarding the place chosen by the suicide were, first, the case of a woman, 84 years of age, who obtained the key of the attic where the domestic water cistern was situated, and who was found shortly afterwards drowned in it. The second was a very remarkable case, and a good illustration of the determination which is often shown by suicides, and their resource in effecting their purpose when foiled in the method first adopted. A domestic servant, 24 years of age, who had previously given no indication of any abnormal mental condition, was missed from her household duties. On a search being made, she was found in the bathroom, lying completely submerged in the bath, which was half full of water. On the floor was found a hatchet covered with blood, which she had evidently used to produce a large number of wounds on her head, in the upper frontal region. The scalp was here divided in several places, and the bone underneath was deeply scored by over a dozen wounds, which penetrated into the diploe, but had not caused any fracture of the skull. Near the window in the room there was an empty bottle which had contained laudanum. The girl had in all probability first attempted to kill herself with the hatchet, and, being disappointed with the result, had taken the laudanum, which probably did not act as quickly as she had anticipated, and she therefore finally filled the bath with water and drowned herself.

Gunshot. — Twenty-four suicides by this method occurred, four by means of carbines, the rest with revolvers. All were males, as naturally such weapons are not so readily available for women, and they are, moreover, unaccustomed to handle them. With regard to the part of the body wounded, the right temple was the favourite site, and was chosen in all instances except two. The two exceptions were the chest and the left temporal region. Why this somewhat awkward situation should have been selected in the latter case is difficult to say, and a wound in such a situation, except in a left-handed or ambidextrous person, might give rise to a suspicion of homicide. That this was not the case in the present instance, was proved by the fact of the revolver being found tightly grasped in the right hand.

Railway injuries caused eight deaths, of which one only was that of a female.

Influence of occupation.—Among the many circumstances which have been proved to influence suicide, occupation undoubtedly plays no inconsiderable part, the suicide rates in occupations involving outdoor manual labour being, as a rule, below the average, while sedentary occupations and such as notoriously tend to an intemperate mode of life, furnish rates which are much above the average. Among the first class are such occupations as miners, labourers of all kinds, gardeners, fishermen, masons, and bricklayers; while in the second class, besides the learned professions of law and medicine, are soldiers, publicans, butchers, fishmongers, greengrocers, commercial travellers, and domestic servants, In an intermediate class may be placed town artisans of all kinds, such as painters, tailors, shoemakers, and factory hands, etc. As a rule, the educated classes have a higher rate of suicide than the illiterate or less educated, and two professions, namely, the legal and medical, have a specially high rate, being, in fact, only exceeded by the rates for soldiers, hotel servants, and publicans. While this is so in the aggregate, it does not appear to be true of Edinburgh, so far as the thirteen years under consideration are concerned, for, while the number engaged in these two professions is exceptionally large, it will be noticed from the following table that only four members of the legal profession and five medical students, some of whom could scarcely be classed as belonging to the medical profession, committed suicide during this period.

From the small numbers at our disposal, however, it is dangerous to attempt to draw any conclusions as to the relative frequency of suicide in different occupations, and I shall therefore merely show in a tabular form the occupations of those suicides in which it was definitely ascertained:—

TABLE VI.

MALES.	
Domestic servants	5
Shopmen	19
Commercial travellers	9
Publicans, brewers	5
Waiters	3
Lawyers	4
Medical students	5
Architect, civil engineer	2
Minister	1
Artists	2
Clerks	20
Druggist	1
Teacher	1
Soldiers	2
Policeman	1
Fireman	1
Excisemen	2
Bakers	5
Plumbers, painters	6
Masons, slaters, etc.	9
Joiners	8
Jewellers	3
Photographer	1
Gilder	1
Metal workers	6
Railway engineers	4
Tailors	2
Shoemakers	6
Whip-brush-makers	2
Rubber workers	2
Chimney sweep	1
Tanner	1
Bookbinders, printers, lithographers, etc.	10
Gardeners	3
Stablemen, coachmen, cab-van-drivers	10
Porters	7
Hawker	1
General labourers	17
FEMALES.	
Domestic servants	10
Dressmakers	3

In conclusion, I should have liked to be able to throw some light upon the motives influencing self-destruction; this, however, is a subject of great difficulty, the information obtainable from relatives and friends being usually meagre and unreliable. On one point, however, namely, the previous existence of intemperance, I have been able to obtain trustworthy evidence, and as this is one of the most certain and frequent causes producing suicide, I am convinced that in those cases in which I find that it existed, namely, 125, we may regard it as the primary, and probably the sole cause. No doubt in many of the other cases it was a factor, though it did not exist to such a degree as to entitle us to ascribe to it a preponderating influence.

In the large majority of the remaining cases, the person was noticed beforehand to be depressed and melancholic, and among the special motives ascribed for the act were the following:—

Insanity	in	7	instances.
Incurable illness	,,	3	,,
Pregnancy	,,	3	,,
Religion	,,	1	instance.
Anger	,,	1	,,
Love	,,	1	,,
Syphilis	,,	1	,,
Erysipelas	,,	1	,,
Puerperium	,,	1	,,
Influenza	,,	1	,,
Epilepsy	,,	1	,,
Injury to head	,,	1	,,

THE PATHOLOGY OF RENAL TUMOURS.[1]

By T. N. KELYNACK, M.D., M.R.C.P., *Pathologist, Manchester Royal Infirmary; Demonstrator in Morbid Anatomy, Owens College, Manchester, etc.*

NO apology is needed for the selection of the pathology of renal tumours as a subject for discussion, when we remember that it is now some sixteen years since the question was prominently brought forward at a gathering of this Association. It was in 1883, at the fifty-first annual meeting, that Mr. Paul of Liverpool, with the co-operation of several British and American pathologists, attempted to formulate a scientific classification of new growths arising in connection with the urinary system. The record of this private collective investigation acted as an immense impetus to the more thorough examination of renal neoplasms, and it is now but seemly that we should review the results which time and numerous workers have supplied us. And yet, in spite of much research, we have still to deplore the meagreness and uncertainty of our conclusions. Many of the published cases are rendered practically useless for pathological purposes, from the only too cursory and incomplete nature of the examination or description of the histological characters of the growth. Unfortunately, also, the days of loose nomenclature are not yet passed. Only by an exhaustive investigation of *every* case of renal growth can sufficient material be accumulated to furnish data for formulating a reliable classification, which shall indicate not only the genera of these tumours, but also their respective clinical features.

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[1] Substance of an Address introductory to a discussion at the Annual Meeting of the British Medical Association, Portsmouth, Aug. 4, 1899.

CLASSIFICATION.—It is manifest that any grouping at the present time must be more or less tentative. A desirable division is such that, while pathologically correct, it may be clinically useful. If possible, it should indicate—(1) Structural characters; (2) seat of origin; (3) relation to age; and (4) local and general tendencies of the growth.

In attempting any convenient classification of renal tumours, it is essential to recognise such well-established facts as the following:—

(1) A certain number of renal growths arise during fœtal life, while the majority manifest themselves subsequent to birth;

(2) Some few are of a simple or benign character, but most have malignant tendencies;

(3) They may assume solid or cystic forms;

(4) Considerable variation is shown with regard to their seat of origin; and

(5) Histologically they more or less conform to the two great tumour types—(*a*) The connective tissue forms; and (*b*) the epithelial forms, although compound and complex varieties not infrequently occur. It is, moreover, advisable, in arranging any complete classification which may be satisfactory clinically, to remember that certain growths arising in connection with extra-renal structures cannot, at least in the majority of cases and with our present limited knowledge, be distinguished during life from true renal growths. For some time to come we shall probably be compelled to rely mainly on structural arrangement as a basis for systematic grouping.

The following I venture to submit as, at least, a convenient and tentative classification:—

1. True renal growths	1. Originating from the connective tissues	(*a*) Benign . . .	Fibroma.
		(*b*) Malignant . .	Sarcoma.
	2. Originating from the renal epithelium	(*a*) Benign . . .	Adenoma.
		(*b*) Malignant . .	Carcinoma.

2. Pelvic growths, generally a malignant papilloma (epithelioma).
3. Hilum growths, generally sarcoma.
4. Capsular growths, generally sarcoma.
5. Growths arising from adrenal inclusions.
6. True adrenal growths
   (*a*) Benign . . Adenoma.
   (*b*) Malignant . Sarcoma.
7. Perirenal growths
   Fibro-lipoma.
   Sarcoma.

GENERAL CONSIDERATIONS.—Primary renal tumours are by no means common. I find, from an examination of our Manchester records, that they are met with in a little less than ½ per cent. of all cases submitted to autopsy. This seems to be in accord with the returns of pathologists elsewhere. In my experience they form from 2 to 3 per cent. of all cases of primary malignant disease examined post-mortem. Even secondary growths of the kidney are far from common. From our pathological reports I estimate that they occur in about 8 per cent. of all cases of carcinoma and over 14 per cent. of all cases of sarcoma.

Renal sarcomata certainly seem to be the commonest form of abdominal growth met with in children.

Comparatively little is known respecting the etiology of renal growths. They are shrouded in the darkness and mystery which more or less envelopes all true tumour formations. Strong evidence, however, is forthcoming to suggest that some at least may be accounted for by embryonic defects, such as a faulty segmentation of the provertebral somites, development of heteroplastic remnants of the Wolffian bodies, or proliferation of adrenal inclusions.

Hereditary predisposition is not a marked feature of these cases, and traumatism, although claimed by some writers, is probably a factor of no importance. Attempts have been made to show that there is an etiological connection between renal calculi and new growths, similar to that which undoubtedly exists between carcinoma of the gall bladder and gall stones.

Renal growths occur in all races in both sexes, among all classes and at all ages. Several have been met with in negro children. As to the influence of sex on the various forms of growth, our present data is insufficient for forming a satisfactory opinion. Most authors claim that males are more frequently affected than females, but this is not in accordance with the returns afforded by cases which I have collected.

The influence of age is very striking. From an analysis of 160 collected cases, I find that eighty-four, or over 52 per cent., originated below 10 years of age, and of these no less than seventy-four were under 5 years. It has also been conclusively shown that renal growths may arise during intrau-terine life.

From the standpoint of age, renal tumours may be conveniently divided into—(1) Fœtal or congenital growths; (2) growths in infancy and childhood; (3) growths of active adult life; (4) growths arising in declining life.

Little need be said here respecting the general characters of renal tumours. These are best dealt with when the individual forms are under consideration. As regards actual size, there is every variety. The sarcomata often reach immense proportions. The carcinomata are usually much smaller. The average weight of twenty-four sarcomata, from subjects whose average age was 3 years, was over 124 oz.

In perhaps the majority of cases a uniform shape is more or less retained. The variations in colour are mainly dependent on the degree of vascularity, or the extent of degenerative changes. The consistency varies greatly: the sarcomata and malignant trabecular cystomata are usually soft and friable, while the adenomata and carcinomata tend to be firm and dense.

There is practically no difference in the frequency with which the different kidneys are affected; and in the sarcomata, particularly the striated cell variety met with in infancy, a bilateral involvement is frequent.

A. TUMOURS OF A CONNECTIVE TISSUE TYPE.—We may now proceed to consider the growths which are conveniently classed as those of a connective tissue type. They are divided into—(1) The simple or so-called benign forms; and (2) the malignant or sarcomata.

I. *Simple or benign growths.*—These are extremely rare, and of little or no practical importance. They are usually of a fibrous or lipomatous nature.

A *fibroma* occurs as a firm small rounded nodule. Some of those recorded may possibly have been adenomata. Several cases have been published where large fibro-cystic or fibro-lipomatous growths were removed by operation. Probably some of these were really perirenal in origin.

Lipoma of the kidney is a very unusual form. Some of the so-called lipomata have been shown to be developments of aberrant adrenal tissue. Undoubtedly some of the cases on record have originated in circumrenal structures.

Angiomatous growths are occasionally met with. In some instances they closely resemble in general structure the cavernous angiomata of the liver. Sometimes more complex forms are met with. Some of the trabecular cystomata may present a strikingly vascular appearance.

The other forms of simple growth of the connective tissue group are mere curiosities, and call for no special note.

II. *The renal sarcomata.*—The great bulk of the growths of the kidney are of the malignant connective tissue type. These sarcomata may most conveniently be divided according to—(1) The period of life at which the growth develops; (2) its seat of origin; and (3) the histological characters.

1. *Sarcomata considered in relation to period of life.—Fœtal sarcoma.*—It is now generally recognised that renal sarcoma may originate during intra-uterine life; indeed, it may reach a size sufficient to produce dystocia. Probably a number of those met with early in infancy commence their development before birth. The rhabdo-myomata in particular commence their growth at a very early period. There is much in favour of the view that at least some of these congenital sarcomata originate in Wolffian remains.

Sarcoma of infancy and childhood.—The first five years of life are peculiarly liable to malignant disease of the kidney, which is nearly always of a sarcomatous type. From an analysis of a large number of cases, I find that over 46 per cent. of those met with in early life occur under 3 years of age. My numbers also tend to show that girls are a little more liable than boys. If this be so, it raises a point of much embryological interest. In about half of the cases the kidneys are involved bilaterally, thus conforming to what seems to be a more or less general tendency with paired viscera. They nearly always grow rapidly, and often assume enormous dimensions. Usually they give rise to little or no pain, and urinary symptoms are generally inconspicuous. The ureter is not often invaded, but the veins are almost always encroached upon, and secondary deposits occur in the lungs, liver, and lumbar, mesenteric, and vertebral glands.

Sarcoma of adults.—Sarcoma, although specially associated with the first few years of life, may develop at any age. It is, however, rare in youth, when general development is most rapid. The years from 5 to 30 are particularly free. From my collected cases I find adult females are more frequently affected than males.

2. *Sarcomata considered according to their seat of origin.*—This is a practical grouping, and one of much interest both to the pathologist and to the surgeon.

The following varieties may be recognised:—Capsular, intertubular, hilum, and perirenal.

The capsular sarcomata spring from the renal capsule in much the same way as a sarcoma arises from the periosteum of bone. Unless met with at an early stage, it may be difficult to define its precise seat of origin. There are, however, several cases on record, and some in our hospital museums, which conclusively demonstrate that a renal growth may arise in this way. The kidney becomes displaced and flattened, or separated from the growth by fibrous tissue. The growth may spread beneath the capsule, encroach on the renal cortex, or perforate the capsule and envelop the kidney.

The intertubular sarcomata spring from the connective tissue of the cortex and medulla, or perhaps, in some cases, from the perivascular and perilymphatic structures. The growth infiltrates the renal substance, and the capsule in early forms can be seen covering the growth, and often the kidney tissue can be detected surrounding or extending over the tumour. The sarcomata met with in adults seem generally to belong to this class.

The hilum sarcomata constitutes a most important and interesting class. The connective tissue around the pelvis and calyces forms the starting point. A large number of the sarcomatous growths in children originate from these structures. The growth at first lies outside the kidney substances, and it is only after some time that the kidney becomes encroached upon, expanded, replaced, or flattened out so as to be hardly recognisable.

The perirenal sarcomata, strictly speaking, should not be included here, since they are altogether extrarenal in origin. Clinically, however, they closely resemble the true renal growths, and hence may be mentioned. They arise in connection with the connective tissue elements of the fatty capsule of the kidney, and consist of fibro-lipomatous tissue, with generally more or less evident sarcomatous cells. They usually develop slowly, often reaching an enormous size before death.

3. *Sarcomata considered in relation to their structure.*—This is, perhaps, the most interesting and instructive division, and certainly the most attractive to the student of morbid histology. It suggests relationships and affinities, and already we can recognise clinical differences according to structural arrangement. The complicated combinations not infrequently met with still, make the question one of considerable perplexity and uncertainty. The majority of the sarcomata consist of *round* and *spindle cells* in varying proportions. The round seem to be the most rapidly growing and malignant in character. The *striated-cell* sarcoma, often spoken of as the *rhabdomyosarcoma*, is met with in the fœtal forms and those met with in infancy. This variety is often termed the "congenital sarcoma." Mixed with the round cells are elongated and transversely striped structures. They are generally smaller and thinner than true muscle cells, and have no sarcolemma. Much variation in size and degree of striation occurs. It has been suggested that they arise from inclusion of muscle elements, due to faulty segmentation of the primitive muscle plates. Some believe that the striated cells are derived from the muscle tissue of the renal pelvis. Others think that they are not to be looked upon as muscle elements at all, but merely ribbings on the surface of a tissue which is not contractile. It is suggestive to note that this curious form of cell is met with specially in hilum growths. In many of these so-called myo-sarcomata, duct-like structures are met with. They generally appear like sections of tubules lined by columnar epithelium. Apparently they are derived from true renal tubules, and some observers have considered them as representing stranded renal tubules, encroached upon and surrounded by sarcomatous tissue. These growths, as already indicated, are very frequently bilateral, although one kidney may be much more involved than the other. I recently had the opportunity of carefully investigating a striking example met with in a child 1 year old. The right kidney formed a huge mass weighing 108 oz., the left kidney was much smaller, weighing only 28 oz.

Very vascular forms, or *angio-sarcomata*, are occasionally met with. I am inclined to believe that they arise more particularly in connection with the perivascular tissues. They sometimes seem to arise in the neighbourhood of the hilum, and, encroaching on the pelvis, give rise to profuse hæmorrhage.

A certain number of the sarcomata present a distinct although variable amount of glandular-like tissue, mixed up with true sarcomatous cells. These *adeno-sarcomata* constitute a very definite variety. The gland-like elements usually occur as groups of tubules lined by well-defined cubical or columnar epithelium, and more or less closely resembling the tubules of a fœtal kidney, but sometimes the epithelial elements have a less definite form and arrangement.

Compound and complex forms not infrequently occur.

Alveolar sarcoma has been described, and is thought to occur in connection with the endothelial lining of lymphatic or vascular channels.

Myxo-sarcoma is simply one of the ordinary forms in which myxomatous degeneration has taken place.

Lipo-sarcoma have been described, but I am inclined to think that they are really of perirenal origin.

Melanotic sarcoma is always secondary. The kidneys are not infrequently affected, when general dissemination is met with.

B. GROWTHS OF AN EPITHELIAL TYPE.—This class includes the adenomatous growths and true carcinomata.

I. *Adenomatous growths.*—1. *The simple adenomata* form a small and unimportant class. They may be met with as (1) simple, or (2) multiple nodules, limited in extent and usually in size. According to their structural arrangement, (1) solid or granular, and (2) cystic forms may be recognised. Some pathologists further divide them into (1) papillary, and (2) alveolar varieties.

2. *The trabecular cystomata* are perhaps best classified in this group. Transitional forms are not infrequent. Some have thought that they have relationships to growths of adrenal origin, but this seems doubtful. The simple forms appear as aggregations of minute cysts. Each cyst is lined with cubical or columnar epithelial cells.

3. *The papilliferous cystomata* generally manifest malignant characters, and must be regarded as closely related to the carcinomata. They present papillary ingrowths, each covered with a single layer of columnar or cubical epithelium. The varying complexity of the intracystic formations depends probably upon rate of growth and adaptation to adjacent structures. The vascular character is often very conspicuous. Sometimes an almost angiomatous appearance is assumed. These growths appear to originate in connection with the urinary tubules. This gives rise to secondary deposits. I have met with a case in a woman æt. 33, where the liver presented enormous masses, which closely recapitulated the structure of the primary growth in the kidney.

II. *Carcinomata.*—Until recently our nomenclature has been so indefinite that it is exceedingly difficult to make any use of the old records respecting "cancer" of the kidney. Undoubtedly many, if not most, were really sarcomata. Of recent years the sarcomata have almost monopolised the attention of the pathologist, and the study of the carcinomata has been much neglected. We are thus left with inadequate material for a satisfactory classification or description of the varieties of this class of renal growths. At the present time, it is almost hopeless to attempt to do more than indicate approximately their general characters. Renal carcinoma probably never occurs in early life. They are uncommon before middle age. After 50, they increase in frequency. They seem to occur in two chief forms—(1) *The glandular type or true carcinoma,* originating in connection with the urinary tubules; and (2) *the surface form or epithelioma,* springing from the lining epithelium of the pelvis and calyces.

1. *The true renal carcinomata* assume either (1) a nodular or (2) an infiltrating arrangement. Usually, they are of a soft cellular structure, although scirrhous and colloid varieties are also described. In the most typical forms an adenomatous arrangement is well marked. In size they are generally much less than the sarcomata, and usually develop more slowly. They tend to extend into the pelvis, and hence hæmaturia is frequently a marked symptom. They are practically always unilateral. Secondary deposits are not formed until late.

2. *The papillomata* occurring in the renal pelvis seem to be almost always of a malignant character. Several have been described as associated with calculi. They appear as very vascular villous growths, much resembling those met with in the urinary bladder. As might be expected, profuse hæmorrhage is a prominent symptom, and not infrequent attacks of pain, resembling renal colic, are experienced. Sometimes a certain degree of hydronephrosis results. A number of these growths have been subjected to surgical interference of recent years.

C. RENAL GROWTHS AND ADRENAL INCLUSIONS.—Hitherto I have not referred to the intensely interesting but most perplexing class of tumours which it is supposed originate from included suprarenal tissue. Adrenal "rests," as they are called, have been found in the periadrenal fat, in the tissues around the solar plexus, in the mesentery, in the broad ligaments, and within the kidney capsule. Is there a relationship between certain forms of kidney growth and aberrant adrenal structures? This is answered by many pathologists unhesitatingly in the affirmative. It certainly is a fascinating view, but the facts on which it rests are still meagre, and I cannot help but think that the judgment of some is only too apt to be captured by a suggestion so attractive. We have still need for diffidence and caution in treading on such new ground. Still, one is compelled to admit that there is undoubtedly a group of renal tumours which present a structure closely resembling the zona fasciculata of the suprarenal bodies. Although of adenomatous appearance, they have affinities with the sarcomata rather than the carcinomata.

The number of cases on record which may fairly be considered as belonging to this class, are probably under forty in number, and hence it is dangerous to attempt any conclusions.

We are quite in the dark as to the influences which lead a so-called "rest" to take on indefinite growth. These tumours seem to be commonest in males, and usually occur in elderly adults. In thirty-two cases the ages averaged—males 50, females 45. Tumours considered as belonging to this class have been discovered as occurring in children. Certainly, curious adenomatous growths are sometimes met with in young subjects, but I have not been able to convince myself that they are of adrenal origin. Usually, only one kidney is affected. Generally, the growth develops slowly, and long remains local. Secondary deposits occur in many of the cases. Several believed to belong to this group have been successfully removed. Some pathologists consider that the so-called endotheliomata and endothelial sarcomata, and probably certain forms of the angio-sarcomata, are closely related to this class.

There is certainly no group of renal tumours needing more thorough investigation than the so-called "adenomatous" group.

D. ADRENAL GROWTHS.—In considering the tumour of the kidney, a word in passing must be given to the growths of the adrenals, as clinically they are almost indistinguishable from renal growths proper, while pathologically they closely resemble certain growths met with in the kidney, and, by a study of the one, light may be expected to be thrown on the character of the other.

1. *The benign or simple growths* occur as the so-called *adenomata.* They are met with as (1) multiple nodules, or (2) large single forms. They present a structure closely resembling the normal adrenal tissue. There is generally an abundant fine fibrous stroma, with epithelioid cells arranged in masses or in columnar form. Sometimes spaces lined with cubical cells occur, and they occasionally present papillomatous ingrowths.

2. *Sarcoma* constitutes the usual form of malignant adrenal growths. They are of rare occurrence, but I have been able to collect a fair number.[1] They occur at all periods of life, but a considerable proportion are met with at early ages. The sarcomatous elements often vary much in size, shape, and general arrangement. In some, multinucleated giant cells have been conspicuous. In a few of the recorded cases, manifestations of a profound nutritional change have been striking clinical features.

In these necessarily condensed notes, while endeavouring to indicate what has been accomplished, I have more especially desired to insist on what yet remains to be done in the unravelling of the structural details of renal tumours. Each genus must receive individual study, for since each has its own particular structure, it may reasonably be expected that each will present more or less definite signs and symptoms.

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[1] "Renal Growths: their Pathology, Diagnosis, and Treatment," 1898, p. 172.

Possibly the time has arrived when a collective investigation might do much to further our knowledge by the gathering together of specimens, the comparison of cases, the consideration of possible relationships, the correlation of clinical histories with exact pathological features, and the sifting of literary material.

Of this we may be certain, if further progress is to be made in the early recognition and effectual treatment of renal tumours, more precise pathological information must be forthcoming, especially with regard to the consideration of structural features in association with clinical manifestations. Only by the accumulation of exact data can we hope to formulate directions whereby the surgeon may know when he can hopefully undertake operative measures, or when he will most benefit his patient by staying his hand.

CASES ILLUSTRATIVE OF SYPHILITIC MENINGO-MYELITIS.

By G. Scott Macgregor, M.D., *Medical Examining Officer to the Glasgow Convalescent Home, etc.*

In the summer of 1891, while acting as clinical medical tutor to the wards of the Glasgow Royal Infirmary, my attention was strongly drawn towards the first of the cases, which is described in the following pages. The patient's peculiar nervous symptoms excited my deep interest, and his case—one of the best illustrations of the extreme difficulty of diagnosing some of the rarer forms of nervous diseases—led me subsequently to devote much attention to similar cases.

That syphilis, especially in its later manifestations, closely simulates many of the nervous diseases, is a fact too often lost sight of, and thus errors in diagnosis are apt to arise from an insufficient acquaintance with the protean characteristics of syphilis, as exhibited in its assaults on the nervous system, more especially when no specific history can be obtained, and patients, lulled with the belief that time, and a short (but all too insufficient) course of medical treatment has finally eradicated the syphilitic virus from their systems, neglect to mention the very important fact of their having suffered from that disease. Thus the poison, not being counteracted, lurks in their system, ready to break out on the first favourable opportunity. The commoner and coarser tertiary lesions of syphilis are only too self-apparent, but the predilection, as Heubner[1] has pointed out, for the syphilitic neo-formations to arise in the periphery of the cord, especially the soft envelopes of the cord, is not sufficiently kept in view, more particularly in the acute inflammatory stages. Does syphilitic meningo-myelitis appear, then, only as a tertiary manifestation? Certainly not. Ferrier quotes a case of acute paraplegia occurring six months after infection, and, in one of the cases reported in this paper, it was only six and a half months from the date of the primary sore that the symptoms of meningo-myelitis manifested themselves. Lamy, Hutchinson, Gowers, and others, have recorded similar instances.

The cases that came under my own observation are as follows:—

Case 1.—J. H., baker, æt. 48, was admitted to the Glasgow Royal Infirmary on 7th May 1891. He complained of pain in all his joints, and in the small of his back, also of tingling and of loss of sensation in the left arm, and to some extent also in the right arm. The present illness began, somewhat gradually, eighteen months before, with pains in the left elbow- and both shoulder-joints. From the time these pains began they had been more or less constant, and occasionally of great intensity. From the Christmas of 1890 the pains in the elbow- and shoulder-joints had become more severe, and for the last four months the patient had been off work. He had observed, with this increase of pain, that there was a marked inability to completely close his hands, more so the left hand than the right, and that his fingers felt as if they were swollen, and that accompanying this loss of power there had, likewise, been a loss of sensation, with tingling in the left hand and arm. These symptoms were in a less degree present in the right hand and arm. The pains were worse at night. The patient had been attending the Eye Infirmary, owing to "weakness of his eyes," but did not know the name of the trouble.

He had always been a very healthy man, had had erysipelas fourteen years before, and a hard chancre when a young man. His father and mother lived to an old age, his brothers and sister were alive and healthy. The patient looked well nourished. There was no swelling of any of the joints, and no pain on pressure. The other systems were normal. The bowels were very costive; the urine showed a specific gravity of 1032; urates in abundance, but no albumin.

1st June 1891.—The pains in the joints had entirely disappeared, but lightning pains of great severity had appeared in the legs. The tingling sensation was still present in the hands. The patient could walk on admission, but now he had completely lost the motor power of his lower limbs, and could not even stand, nor move himself in bed. The patellar reflexes were quite absent. On the left hip and left side of the thorax were superficial bedsores. Retention of urine with marked constipation had occurred.

19th June 1891.—The patient suddenly began to get very breathless, his face became pale and anxious, and he looked extremely feeble. He cried out from time to time, owing to the severity of the pains. His left hand was extremely cold, and quite unable to grasp; his right hand was warm, and could grasp, although feebly; his pulse was very feeble and thready. He complained of a "deadness" all over his body, but felt pain on pricking him with a pin. He died at 7.30 P.M.

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[1] Article on "Syphilis of the Cord" in Ziemssen's "Handbuch."

Post-mortem examination.—The body was fairly well nourished, with a slight tendency to subcutaneous dropsy of the back and of the lower extremities. On the left hip and left side of the thorax there were superficial bedsores. After removing the arches of the vertebræ, the posterior surface of the spinal dura mater presented a normal appearance, but its anterior surface was firmly adherent to the osseous surface. This was particularly the case in the lower cervical and in the lumbar regions. On removing the cord and exposing its posterior surface, an area of intense hyperæmia, from 2 to 3 in. in extent, was discovered in the soft membranes immediately above the lumbar enlargement.

On examining the anterior surface of the cord, a most striking area of softening in the middle dorsal region was exposed. This area was about 2 in. in length, was of an opaque white colour, and by its swelling had caused a considerable increase in the thickness of the cord where it was situated. It practically involved the whole thickness of the cord, and on more careful examination it could be seen posteriorly. In this region the tissue of the cord was of the consistence of thick cream. At several points below this main area of softening, the spinal tissue was much softer than normal. It should have been mentioned that the dura mater, in front of the upper part of the cauda equina, was thickened and very adherent.

The cranial dura mater presented nothing very remarkable, but the soft membranes covering the vertex were very distinctly opaque and highly œdematous. Examination of the base of the brain revealed, on the whole, healthy characters, and no exudation was in the least visible. The vessels were healthy. On cutting into the lateral ventricles, however, they were found to be distended with a reddish coloured serum, their walls were not markedly softened, and the cerebral tissue generally presented healthy characters. The heart was normal, though the external fat was somewhat increased in amount. The right lung was universally adherent by old adhesions. At its apex a considerable amount of cretaceous matter was present. The left lung was normal. The spleen and liver were both normal. The kidneys were very distinctly congested. On opening into the urinary bladder, the mucous membrane presented a normal appearance.

Resumé of the post-mortem.—Softening of the spinal cord; pachymeningitis chronica spinalis; acute hyperæmia of the soft membranes of the cord; dropsy of lateral ventricles of brain; œdema of the soft cerebral membranes of vertex.—A microscopical examination of the softened and enlarged area in the spinal cord showed isolated fragments of the nerve fibres, droplets of myelin, and occasional compound granular corpuscles. The nocturnal character of the pains, the presence of superficial bedsores on the left hip and the left side of the thorax, the remarkable manifestation of feebleness of the left hand and arm, and to a less degree that of the right hand and arm, the somewhat acute development of paraplegia of the lower extremities towards the close of the illness, pointed to a spinal paralysis not confined to any particular segment of the cord, but disseminated in diverse parts. Tuberculosis might have produced these spinal symptomatic phenomena, but the absence of any tubercular signs or symptoms, coupled with the definite history of a hard sore contracted many years previously, concurred in stamping this case as one of syphilitic spinal paralysis.

Lamy has demonstrated the marked tendency of syphilis to infect the blood vessels with a predominance of infiltration at their periphery, with nodular formations occurring around the capillaries, a peri-endophlebitis obliterans, with infarcts causing obstruction to the blood vessels at various points, thus leading to the cutting off of the blood supply to distinct areas of the cord, with resulting softening and finally disintegration of the nerve structures.

Grieff[1] has pointed out the co-existence of spinal meningitis, arachnitis, and lepto-meningitis with lesions of the blood vessels which run at the surface of the cord; and he admits the intimate relation between the meningitis of one part and the arteritis and phlebitis of another part.

Gilbert and Lion[2] admit that the diffused embryonic meningo-myelitis probably characterises the initial state of the medullary syphilitic productions. These authors describe in detail this form of anatomical lesion. Here the alterations are not infrequently inappreciable to the naked eye. The microscopical lesions are represented by a luxuriant proliferation of young cells that occupy more particularly the pia mater and its prolongations, principally conglomerated around the vessels. They penetrate the vascular tunics themselves and dissociate them. The lumen of the vessels becomes a slit, sometimes it is completely obliterated.

The following case is an example of syphilitic meningo-myelitis in its initial forms:—

Case 2.—Mrs. D., æt. 42, admitted to the Glasgow Royal Infirmary on 3rd April 1894, complaining of inability to sit up or move her lower limbs. She stated that on 30th March 1894 she was in the enjoyment of her usual health, and that, while sitting mending shirts during the middle of the day, she was suddenly seized with a feeling of numbness in her lower extremities. She nevertheless was able to get up and go into another room for mustard oil, with which she rubbed her limbs. This was immediately followed by considerable relief to her symptoms. On resuming her work she was again suddenly made aware of a peculiar pricking sensation and of a numbness creeping over her lower limbs, accompanied by pain and weakness in the small of the back. She now for the first time discovered that she was quite unable to move her lower limbs, and had to be lifted into bed.

On admission four days later, she presented the following signs and symptoms:—Her face wore an anxious expression, while her complexion was somewhat sallow. There were marked nervous twitchings of the face, more especially the eyelids, and restless movements of the arms. At the same time she had no severe pain, with the exception of a slight twinge about the small of the back, which shot round towards the bottom of the abdomen. The pulse-rate was 140 per minute, while the temperature was 102° F. There was loss of control of both sphincters and also loss of motor power of both limbs, while sensation in the affected parts was normal. There was complete absence of the knee jerk, nor was ankle clonus present. There was no cramp in the legs, no anæsthesia, no analgesia. She could quite readily localise tactile impressions; any girdle pain was very slight, the sponge test was negative; there was no flaccidity nor atrophy of the muscles of the lower limbs. There was evidently some vasomotor disturbance present, as was seen by the marked ecchymosis on both heels. It may be added that her temperature meanwhile was sometimes as high as 104° F., with respirations occasionally 50 per minute, and a pulse-rate of 150 per minute, while occasionally a hectic flush might be seen on both cheeks. The tongue was rather glazed and dry. Physical examination of the chest revealed nothing of a special character; there was only some loud sonorous râles heard over both lungs at various points.

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[1] "Ueber Ruchenmark Syphilis," 1882.

[2] "De la syphilis medullaire precóce," 1889.

From 3rd April, the date of her admission to the hospital, the above symptoms remained virtually unaltered until 10th April, when they suddenly presented a marked change of character. Then the still more frequent respirations, the commencing irregularity of the heart beat, and the falling temperature, all betokened an increasing exhaustion. She rapidly passed into a state of complete unconsciousness, and, gradually sinking, died on the morning of 13th April. It need only be added that the temperature continued to fall steadily from 10th April until within four hours of her death, when it registered 96°·2 F. The urine was found to present the following characters:—Reaction alkaline, ammoniacal odour; mucus, pus, and albumin present.

The result of the post-mortem examination was as follows:—The body was that of a well-developed woman, not much emaciated. On laying open the spinal canal, the dura mater presented quite a healthy appearance, but on reflecting this the soft membranes were found to be unusually adherent to it, and likewise to the cord beneath, and they were also seen to be infiltrated with a white fibrinous deposit, confined, however, to the lower dorsal portion of the cord. There did not appear to be much increase of vascularity, and the cord appeared quite natural in density and colour. It was put in Müller's fluid for further microscopical examination. The heart and lungs presented quite healthy appearances, except that the heart had a much greater amount of fat on it than usual. The liver had several nodules in connection with its capsule, both on its upper and lower aspect, having the appearance of cicatrices, and on section these presented all the characters of syphilitic gummata; and a subsequent examination under the microscope proved them to be undoubted gummata. The spleen and intestines presented healthy appearances. The mucous membrane of the bladder was very vascular and thickened, the ureters were slightly distended, but did not appear inflamed, and contained nothing abnormal. The pelvis of the left kidney was also somewhat dilated, and its mucous membrane appeared very vascular. The cortices of the kidney appeared atrophied but pale, and evidently had been the seat of a parenchymatous nephritis; the capsule was adherent, and left a roughened surface on being detached.

On 6th July 1894 I examined sections of the spinal cord; it had previously been embedded in celloidin, cut and stained with carmine. Under the high power of the microscope, sections of the cord at the level of the lower portion of the dorsal region presented the following characters:—The vessels of the cord were large, and injected with numerous small red corpuscles, the soft membranes surrounding the cord showed a fibrinous infiltration; the sections otherwise presented a perfectly normal appearance. A section from the cervical portion of the cord showed normal characteristics, the vessels were neither enlarged nor injected. The sudden and complete paraplegia, the high temperature, rapid pulse, and hurried respirations, followed by a speedily fatal termination, combined to indicate an extensive involvement of the spinal cord itself, while the almost total absence of pain and trophic disturbances precluded the idea that any sclerosis or compression of the nerve roots had taken place. The post-mortem, however, revealed a condition of affairs quite out of proportion to the severity of the symptoms, and at the same time disclosed the existence of syphilitic gummata, which etiological factor, in the presence of this explosive spinal disease, could not well be overlooked. I am therefore of opinion that we had to deal with a specific infection, which produced toxic effects on the vital centres.

Lamy[1] reports a case where the patient died nineteen days after the development of the paraplegia. In the autopsy he states that to the naked eye there was almost complete integrity of the cord and its meninges; but on microscopical examination a diffuse gummatous arachnitis and lepto-meningitis in all its extent, with marked infiltration of the walls of the blood vessels, and the presence of a peri-endophlebitis obliterans. Siemerling reports a somewhat similar case in a woman 47 years of age, who developed a sudden paraplegia, which proved fatal in less than a month. The medullary lesions were inappreciable to the naked eye, but the microscope revealed the existence of a focus of meningo-myelitis in the inferior dorsal region; a microscopical gummatous focus emanating from the pia mater, and advancing into the cord. There existed at this level some important lesions in the anterior spinal vessels, the vein was entirely obliterated, the artery alone presented an embryonic infiltration of the tunica adventitia. Rumpf,[2] in his conclusions on the vascular phenomena in the cord from syphilis, states that he verified, at the level of a focus occupying the dorsal region of the cord, an intense infiltration of the arteries and the veins. These were almost completely obstructed, and their walls were infiltrated with numerous cellular elements.

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[1] "Iconographie de la salpêtrière."

[2] "Ueber Gehirn und Ruck."

The post-mortem appearances of the lesion in the case under consideration were principally confined to the soft membranes. These were found to be unusually adherent to the dura mater, and likewise to the cord beneath, while a white fibrinous deposit infiltrated the soft membranes, localised, however, in the lower dorsal region. The only changes observable in the microscopical sections of the cord examined, at the level of the lower dorsal region, were a marked enlargement and injection of the blood vessels with numerous small corpuscles. Other sections showed normal characteristics.

In this case we have, then, the initial stage of the syphilitic neo-formation, where, however, the meningitis is the chief characteristic, but so virulent in its nature, that death ensued before any anatomical lesion had had time to take place in the medullary substance. In the two following cases the points of interest are—The early onset of the paraplegia in the first case; it appeared six and a half months after the primary syphilitic infection. In the second case, its hereditary transmission, with the disappearance of all the symptoms on the exhibition of mercury.

Case 3.—Jane A., servant, æt. 36, admitted to the Glasgow Royal Infirmary on 25th February 1895, complaining of loss of power, of six days' duration, in her lower limbs. Up to last July she was quite healthy. About that time she contracted a sore, which was followed in about a month by a rash over her whole body. She also had a sore throat, and was troubled with her hair falling out. Her parents were both alive. There were eleven of a family, of whom two were dead—one from croup, the other from whooping-cough. On Tuesday, 12th February, she had a difficulty in passing her water, and could only pass a small quantity. On Wednesday she required to get it drawn off. On Thursday, while sitting in her chair at home, she felt a severe pain in her back and in the lower part of her abdomen; she described it as being like "flashes of fire." On rising she experienced great difficulty in walking to her bed, owing to the loss of power in her legs. The pain did not radiate to her arms or legs, but passed away in about twelve hours. Next morning she found that she was quite unable to move her legs. From that time she had not been able to pass her urine voluntarily, and had lost control of her bowels. There was no history of any injury or of alcoholism.

The patient was a well-developed woman. There was a large, discoloured circular patch present above the right eyebrow. A circular healing ulcer was present on the outer side of right ankle, and some bullæ were present on the toes of right foot. An abraded surface was seen on each hip. No defect of any cranial nerve was apparent. On tapping along the spine, slight pain was complained of over the lumbar region of the spine. Tactile, thermal, and painful sensations were all absent in both legs, up to and about the level of the anterior-superior spines of the ilia. Knee jerk was absent, and there was no ankle clonus.

The plantar reflex was present, however, in the right foot, and the abdominal and epigastric reflexes were absent. The glands in the groin were enlarged, and pustules were present on her back. She was able to draw in her abdominal muscles, but they did not seem to retain full power. The dynamometer registered R. 24, L. 32. The chest was broad and well formed, and the movements were good. Percussion and auscultation revealed nothing abnormal. The apex beat was in its normal situation; the cardiac dulness was normal; the pulse 100 per minute, regular and compressible; the heart sounds were pure. The tongue was slightly furred; the appetite was good; the bowels were confined; and the temperature was 99°·6 F. The urine showed an acid reaction on being tested, the specific gravity was 1032, and urates were present, but there was no albumin.

27th February 1895.—Tactile sensation was still slightly present in both legs, but thermal and painful impressions were absent in both. A cord-like feeling was present at the lumbar region running round to the umbilicus, but the sensibility was good at the umbilical level. She could not move her legs or her toes in the slightest degree.

6th March 1895.—Tactile, thermal, and painful sensations were slightly present in both legs. There was no knee jerk; the plantar reflexes were both active, but there was no power of voluntary movement.

13th March 1895.—She did not feel the nurse passing the catheter. On 1st March she had felt the catheter being passed, but had not felt it afterwards. She said that she could appreciate touch as low down as the fold of the groin. From 1st March a troublesome cough had appeared, but the pain in the back and abdomen, which was a prominent symptom, had now abated.

14th March 1895.—She could move the great toes of both feet, and slight sensation was still present in both legs.

25th April 1895.—There was no voluntary movement when her right leg was pinched, but she stated that she felt the pinch in her left. The sensation to the cold test was not felt, and on applying the hot test she felt it only in the left leg. This leg was slightly drawn up shortly after the hot test tube had been applied. The powers of bladder and bowel were still in abeyance; the urine contained pus; the limbs were very cold, and the muscles were soft and flabby. There were bedsores on her right hip, and she had a feeling of pins and needles in her legs.

1st May 1895.—Her friends removed the patient to her home in the country. A few months later I wrote the father of the patient, and he replied that his daughter gradually got worse, until finally she died on the 16th of June 1895. While in the hospital she was put on large doses of mercury and iodide of potassium.

CASE 4.—The last case here recorded is that of a schoolboy, æt. 12, suffering from ataxia, which had come on two days previously. This was in November 1894. The patient had suffered for three months from severe and persistent headaches, and on tapping him sharply over the right frontal region he complained of pain. He was a quick, intelligent lad, and answered my questions with much clearness. His eyesight was normal, his temper irritable and changeable. He complained of a slight feeling of pain in the small of the back, but there was no girdle sensation, and on percussing the spine nothing abnormal could be detected; neither was there any increase of pain over the region complained of. The ataxia was most pronounced. The boy could not cross the room unsupported, and the patellar reflexes were increased. He slept fairly well, but his urine dribbled away involuntarily, and his bowels were very constipated. His pulse and temperature were normal, his tongue clean, and his teeth typically peg-topped. Though I could not obtain any knowledge of a specific taint through the parents, I, notwithstanding, adopted antisyphilitic measures, putting the boy on hydrargyri perchloridi and potassii iodidi with mercurial inunctions. I found that the urine ceased to dribble a few days after the commencement of this treatment, and at the end of fourteen days the boy was able to walk across the room unaided. Three months later he was perfectly strong, his headaches had entirely disappeared, and up to the present he is well and healthy.

Lamy has attempted to classify this syphilitic invasion, from its clinical and pathological appearances, under three distinct types or classes, a classification which, however, must always remain somewhat artificial, namely—(1) Acute syphilitic myelitis; (2) syphilitic meningo-myelitis; (3) syphilitic spinal paralysis. He then details the various signs and symptoms common to each form, adding that, in the early onset of acute syphilitic myelitis, however, it must never be forgotten that there may be all the symptomatic phenomena that occurs in the second and third forms.

From the foregoing cases we may fairly deduce that—

Syphilis scatters its lesions broadcast, either by contiguity of the blood vessels or infarcts; its propagation by the blood vessels leads to dissemination of the lesion, which entails dissemination of the symptoms: that the arrangement of the blood supply of the cord makes it impossible to confine the lesion to any particular segment: that acute syphilitic myelitis may declare itself early in the secondary period. The lapse of time does not seem to modify the severity of the attack, and it may be transmitted hereditarily. It is curable, as was evidenced in the last recorded case; instances similar to which have been related by Charcot, Lamy, M'Call Anderson, and others.[1]

Our prognosis must be guarded, since recovery does occasionally follow the active exhibition of antisyphilitic remedies. It is therefore incumbent on us to treat every suspected specific case on the strictest antisyphilitic principles.

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[1] M'Call Anderson, *Brit. Med. Journ.*, London, 1896; Brissaud, "Maladies nerveuses"; *Med.-Chir. Trans.*, London, 1895.

INFECTIVE ENDOCARDITIS. REMARKS WITH ILLUSTRATIVE CASES.

By R. Kirkland, M.B., *Physician, Cheltenham General Hospital.*

During the past few years there have been several cases of infective endocarditis in our wards. Under my own care there were two interesting cases, exemplifying different types of the disease, which I propose giving *in extenso.* Differing totally as regards duration, severity, and symptoms, they agreed in this, that in the post-mortem both presented evidences of previously damaged and thickened valves beside the recent lesions, and both showed no evidence whatever of ulceration in the endocardium or valves.

The condition of the valves, in my opinion, is the outstanding fact of importance in this disease. Personally, I have seen no case in which there were not old antecedent valve changes, if we exclude those which are simply associated with septic processes either traumatic or puerperal, and to which the name of infective endocarditis does not properly apply. I do not say such cases may not be, but that they are rare is shown by the fact that Dr. Goodhart found, in a series of sixty-nine cases, sixty-one presenting old valve thickening. Osler's percentage, where chronic valvulitis is met with, is only twenty-five; further on he qualifies this, however, by saying this must be a much smaller percentage than actually occurs.

As to the nature and cause of infective endocarditis, there is a considerable diversity of opinion. In all its forms it is essentially a mycotic process, the local and constitutional effects being produced by the growth on the valves, and the transference to distant parts of microbes which vary in character according to the nature of the infection. In this connection the question naturally arises, how is it that the micrococci in this form of endocarditis are so potent for harm, when in other diseases, in which they are equally prevalent, they should be inert? We know that various organisms—such as the pneumococcus of Fränkel—are constantly found in the upper part of the respiratory tract, and the whole length of the alimentary canal without harm. They are, however, always ready to creep into the tissues, but are prevented in normal conditions of health by the barrier of epithelium, and the amœboid cells or phagocytes. In truth, in the tonsils and Peyer's patches, a constant struggle is going on between the microbes and the amœboid cells of the adenoid tissue. If these structures are weakened from any cause, the barrier may be broken, and a general invasion of the body result. Even then, whether an infective endocarditis result, will depend, I believe, on the condition of the valve tissue. In the case of pneumonia, or other disease such as pyæmia, in which we may suppose microbes are circulating in the blood, the endothelium of normal valves is able to resist their invasion. If, however, the tissue tone is lowered, and the valves sclerosed or malformed, and thus vulnerable, a suitable soil is afforded, and infective endocarditis may be the result. Goodhart compares patients with chronic sclerotic valves to walking mushroom beds, in common time without spawn, but, in periods of epidemics, germs may enter by various channels, which fertilise in those cases into malignant or infective endocarditis.

As I have already said, the micro-organisms found in the vegetations seem to depend upon the nature of the causative agent. Following an attack of erysipelas or tonsillitis we may find streptococci, after pneumonia the pneumococcus, after diphtheria the Klebs-Löffler bacillus, etc. I believe the gonococcus may also be found when this form of endocarditis supervenes on gonorrhœa. In two of the cases which I am about to relate we were unable to find how infection was communicated. There had been no previous attack of erysipelas, sore throat, otitis, or chronic gleet, and the skin was unbroken. There may have been some abrasion in the throat, lungs, or intestine, or the patients may have been exposed to insanitary surroundings. Such form the most interesting cases of this disease, and the name arterial pyæmia, as given by Wilks, is appropriate.

Where the infection is from the venous side, as simply a later phenomenon of a general pyæmia, traumatic or puerperal, the condition is hardly diagnosable when it supervenes. It seems to me such cases should hardly be included under the name of infective endocarditis. The infection is from the periphery towards the centre, it is simply an association of a septic process. The name is better restricted to cases where infection seems to be from the centre towards the periphery, the left heart being involved, unless in cases of malformed valves, when the right heart may be the starting-point.

The exact frequency with which the disease is associated with rheumatism is given by Osler as 26·3 per cent., but of course the percentage would be much higher if venous pyæmic secondary cases were not included, as I maintain they should not. As a complication of pneumonia, it would have seemed to me to be much more rare than Osler's figures would indicate, namely, eleven in 103 cases. This frequency is surely different to our experience in this country. To account for this prevalence amongst his cases of pneumonia, there surely must have been some other deleterious agent at work.

Like the simple form of endocarditis, the affection seems more common in the young than in the old. Those who are exposed to cold, want, and other injurious external influences, or the dissipated, probably suffer more frequently than other people. Some of the authorities seem to think that season has some influence on the occurrence of the disease, most of the cases commencing during the months of September or October. Into the pathology of the disease I do not wish to enter, except to remark that the most characteristic naked-eye features are the vegetations on the valves, and in some cases the presence of ulceration. In the slightest forms we may have a simple abrasion, or we may have a process of erosion by which half a valve may be destroyed, or septum or wall of the ventricle perforated. The interesting pathological features in the disease are the changes due to embolism, which may present the characters of ordinary hæmorrhagic infarcts. In well-marked cases, however, they may not be found, or one or two only in the spleen or kidney; at other times they are scattered throughout the various tissues of the body.

Hæmorrhages upon the skin, serous and mucous surfaces, are very frequent, and may be due, as in other infectious diseases, to the effect of the microbic toxins; but sometimes they are undoubtedly embolic, and a minute necrotic or suppurative centre is seen. Of the various organs the spleen is most often the seat of infarction, then the kidneys, and at times the gastro-intestinal tract. The latter was very likely the seat of infarction in my second case, that of the boy C., as he had several hæmorrhages from the bowel.

With regard to the symptoms of the disease, it may be said that in no malady are they more varied. Its onset may be with rigors, pain in the back, headache, vomiting, like any acute fever. Pyrexia is constant, but, as the charts of my cases show, variable in type and intensity to a remarkable degree. Signs of severe constitutional disturbance, as extreme prostration, sweating, and delirium, are usually present. Cardiac symptoms may be marked, as pain over the pericardium, murmur, distress, and palpitation. In other cases they do not obtrude themselves, even although there had been old valvular disease. Even when carefully looked for, as in C.'s case, they may not be detected. As Mitchell Bruce has well put it, "the phenomena of cardiac inflammation in malignant endocarditis are comparatively subordinate to those of general infection."

The embolic processes give a special prominence to local symptoms, which may divert attention from the general malady. Thus paralysis, coma, or delirium may arise from implication of the brain or its membranes, pain in the side and local peritonitis from infarct in the spleen, hæmaturia and pain in the back from infarct in the kidney, and loss of vision from retinal hæmorrhage.

Three types of the disease are recognised—the intermittent or malarial, the cerebral, and the typhoid. The text-books mention a fourth type, the cardiac, but this seems superfluous, as nearly all the cases, whatever the type, occur in persons in whom the heart has been already damaged. If retained, this type, the cardiac, might include only the subacute or chronic cases with prolonged and irregular course, and where, if in any type, recovery occasionally takes place.

The following cases serve as illustrations of the various types:—

Case 1.[1]—T. H., æt. 26; occupation, labourer; admitted 24th July 1893. There was nothing of special moment in his family history, except that his mother died of rheumatism.

Personal history.—He formerly served in the Army Service Corps and in the Militia. When at Aldershot he had acute rheumatism, from which he recovered, but with morbus cordis.

Present illness.—Patient went into camp for militia training, and on returning, 1st July, he was seized with pains in the joints. A doctor was sent for, who ordered his removal to the hospital, where he was admitted on 24th July.

Present condition.—He is thin and anæmic, sweating profusely. Temperature, 99°·8 F.; pulse, 70; respiration, 21. Swelling of joints not now perceptible, but the left leg is swollen. Pulse is regular in rhythm, tension low, not quite regular in volume. Heart apex is within the nipple line. There is a loud rasping murmur, heard in the mitral area, also in the axilla, and prolonged to the angle of the scapula; pulmonary second sound somewhat valvular. Urine has a low specific gravity, 1008; quantity, 36 oz., no albumin. No cutaneous rash, and no splenic enlargement could be detected. Examination of other systems negative. At 6 p.m. the temperature rose to 104°·6 F., when antipyrin, 5 gr. in half an ounce of brandy, was given, and at 10 p.m. temperature was 99°·4. Next day at 4 a.m. the temperature was 105°2, patient having a well-marked rigor. By 8 p.m. the temperature was subnormal.

28th July.—There appears to be a diurnal rise in temperature; he has had no more rigors, and seems to be fairly comfortable but for the profuse sweating. Heart condition has not changed, no splenic enlargement, no capillary emboli observed in skin. Quinine, 10 grs., was ordered to be given when temperature began to rise.

30th July.—Patient has been wandering a good deal at night. The character of the mitral murmur has changed, now soft and blowing. Next day he was still delirious. Aortic second sound is somewhat flappy, while the first is almost inaudible. Had rigor again at 6 a.m. Patient still sweats profusely. The temperature seems much improved by giving quinine, 10 grs., as the rise is occurring. His condition remained much the same until 9th August, when he became more collapsed and almost comatose. Now, there is nothing like the variation in temperature. Three days later the left parotid was found swollen in the morning, and there was increase in splenic dulness. The ice-packs which had been ordered some time previously had to be left off, as he became too collapsed. On 17th August the temperature again resumed its oscillating character, and he complained of pain in the left side, when I detected friction sounds over the lower lobe with dulness (hæmorrhagic infarct). The parotid is still swollen, and the pulse is almost imperceptible. Next day he was much troubled with cough, and had hæmoptysis. On the evening of the 21st he died collapsed.

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[1] For the notes of this case I am indebted to our former house-surgeon, Dr. Hutchison.

POST-MORTEM.—Made on the evening of 22nd August. The body was fairly well nourished. There was well-marked abdominal distension, the intestines being full of gas.

Spleen was large and soft, weighed 12 oz.; irregular nodules were felt all over it, and one or two patches of dark colour were seen on the surface. On section, one found two or three areas, yellowish white in colour, and pyramidal in shape, appearing to be decolorised infarcts; one infarct has pus in the centre.

Kidneys.—Right weighed 7½ oz., left 9 oz.; both large, pale, and flabby.

Liver.—Fatty.

Heart.—There was incompetence of the mitral valves, a long vegetation was found hanging down from the anterior segment, and there were several small vegetations on the cusps and chordæ tendineæ. No ulcerated surface visible to the naked eye. The other orifices were normal.

Lungs.—Left lower lobe in part consolidated from hæmorrhagic infarct.

The chart of this case shows its remarkable resemblance to ordinary quotidian ague. The paroxysms may have the absolutely typical features of intermittent malarial fever. Here we had the rigor, the hot and sweating stages succeeding each other with perfect regularity. Still there was no difficulty with regard to the diagnosis, for the endocardial mischief was apparent, and he had never been in a malarial district. Quinine, too, failed to modify the paroxysms to any extent. No examination of the blood was made for the malarial parasite, as it seemed superfluous.

CASE 2.—This is an example of the cerebral form of the disease. The boy was sent into hospital on the evening of 2nd September 1895, supposed to be suffering from cerebro-spinal meningitis. These are the notes of the case:—

Albert C., æt. 9.—Boy's family and personal history were not obtainable. The information we could get was that he was suddenly taken ill three days before admission, with feeling of malaise, vomiting, and vague pains in the limbs. When I saw him on 3rd September he was lying in an apathetic, semi-unconscious condition, hyperæsthetic, and irritable when touched, not unlike a case of meningitis. Pulse was very rapid, of low tension; temperature, 103° F. His tongue was dry and covered with sordes, his pupils were equal and active. On examining the limbs, no swelling of the joints or periosteum could be detected. No discharge from the ear or mastoid swelling. A few petechial spots were observed on the inside of the legs. Although the heart was carefully examined, no murmur at any of the valves could be heard. Examination of the lungs was negative. Spleen was not enlarged, and the abdomen was not distended. In the afternoon there appeared on the face and chest numerous small round papulo-erythematous spots, separated by normal skin.

Next day, 4th September the boy was manifestly worse; pulse 168, respirations 54. The spots have taken on a hæmorrhagic character, and do not fade on pressure. After an enema the bowels moved four times, three of the motions containing blood. Next morning he died, as if from profound blood poisoning.

POST-MORTEM.—The lungs were found to be healthy. The pericardium contained a small quantity of fluid. On opening the left ventricle the heart muscle was found thickened, there being some hypertrophy. Soft recent vegetations were found on the aortic valves, the cusps of which were somewhat puckered, evidently an old lesion. Bacteriological examination of the vegtations showed numerous streptococci and staphylococci. Spleen healthy. Kidneys presented numerous hæmorrhagic spots on the cortex.

I confess I had great difficulty in diagnosing this case. We had sudden onset, intense prostration, rapid pulse, dry brown-coated tongue, hyperæsthesia, delirium, with petechiæ and hæmorrhagic eruption. Such symptoms might indicate either hæmorrhagic smallpox, hæmorrhagic measles, cerebro-spinal meningitis, or infective endocarditis.

In some cases of hæmorrhagic smallpox a petechial rash occurs on the upper part of the thigh, and along Poupart's ligaments as an initial rash, on the second or third day of the illness; the eruption on the fourth day on the forehead, however, was not sufficiently hard and shotty to bear out that hypothesis. When the papulo-erythematous rash appeared on the face and chest, the fourth day of the illness, hæmorrhagic measles was thought of. But, as far as we could get reliable information, there were no cases of smallpox or measles in the neighbourhood from which he came. It is unusual, too, for severe forms of the former illness to occur in the vaccinated. Had a murmur of changeable character been detected, the embolic showers on the skin would have pointed to the diagnosis. Without such a murmur it was almost impossible to distinguish it from a case of cerebro-spinal meningitis, the diagnosis made by the medical man who sent the case in, unless perhaps in these respects, that the rigidity of the neck was not so great, and there was an absence of herpes.

CASE 3.—The present case I had charge of during the absence of a colleague. For a time I thought it belonged to the typhoid type of the disease, but as later on the diagnosis was amended, it seems absurd to give it in this connection. Nevertheless it appears to me well worth recording, as, besides illustrating the difficulties of diagnosis between typhoid fever and the typhoid type of infective endocarditis, it possesses interesting features of its own.

Robert L., æt. 35, butler, admitted into hospital 12th September with acute rheumatism. For the earlier period of his illness he was under my care, during the absence of Dr. Wilson, whose in-patient week it was. There could be no doubt as to the nature of the malady, for knees, wrists, and ankles were swollen, hot, painful, and with a reddish blush, and there was profuse acid perspiration. He was anxious and restless, and complained of slight præcordial pain. The first sound at the apex was muffled in character, and, two days after, this was replaced by a mitral systolic bruit, and at the same time friction sound was heard over the right ventricle. For six days his progress under salicylate and bicarbonate of soda was quite satisfactory. Then the temperature jumped up from 101° F. to 106° F., in the course of twenty-four hours. For fourteen days it was markedly remittent, but on the fifteenth it touched the normal, the maxima for these fourteen days succeeding the sudden rise being 105°·6 F., reached on three occasions. What precise influence the tepid sponging or the ice rubbing had on its behaviour, it is difficult to say; no doubt it modified it, but at any rate it markedly differed from the usual chart of typhoid fever. At an early stage of this complication there was great prostration and delirium. The tongue became dry and covered with sordes, and later on there was abdominal distension, but no rose spots, and diarrhœa was not a marked feature. Spleen was not palpable. At the same time there were no rigors, petechiæ, or embolic phenomena. Sonorous râles were heard over the bases of both lungs behind, a condition common both to typhoid fever and the typhoid type of this disease. At the end of four weeks his temperature began steadily to decline, the tongue to clean, and convalescence was unimpaired. As to the heart condition, the pericardial friction sound ceased without any evident effusion, and beyond a slight impurity of the first sound at the apex there was little if any damage to the organ.

The supervention of these symptoms in a case of rheumatic fever, with endocarditis developing under one's very eyes, made me lean to the diagnosis of malignant endocarditis of the typhoid type. In favour of this opinion was the abrupt origin, the quickly rising temperature, and the irregular type of the latter, the remittent at times becoming intermittent. The prostration, too, was early and great. The abdominal distension and lung symptoms are common to this and to typhoid fever. Strongly suggesting typhoid fever, however, was the step-like fall of temperature between the fourth and fifth week, with complete and unimpaired convalescence. Widal's serum test was not then known, otherwise it might have helped to clear up the difficulty at the end of the first week. Evidently during the attack of rheumatic fever with peri-endocarditis he was at the same time incubating typhoid fever,—a unique case in my experience.

Case 4.—As an illustration of the type that might be called cardiac, I give a few short notes of an ordinary case:—

Sarah K., æt. 17, laundress. She had acute rheumatism three years ago, knees and ankles being affected, and was ill then for six months. Nine months ago she had another attack, and was admitted into hospital under my care. Besides the acute rheumatism she had a much enlarged heart, with double aortic bruit. This I was inclined to think was a legacy from the first attack, possibly rendered worse by the fresh endocardial mischief. At the end of eleven weeks she was dismissed in a fairly satisfactory condition, heart compensation being well maintained.

In the interim she had an attack of erysipelas, and was again sent into hospital on account of swelling of left knee-joint, having apparently recovered from the erysipelas. The salient features of the case now were these. She had an anxious look, complained of præcordial pain with great restlessness. There were double aortic and mitral systolic murmurs. The apex beat was diffused and undulatory, extending from the epigastric region to the left of the nipple line, showing engorgement and dilatation of both cavities. She had irregular fever, frequently intermittent, the maxima on several occasions being 102° F., with periods of apyrexia. Pain in the region of the spleen was complained of, which organ was enlarged and easily palpated. Sharp pain on the right side of the chest was also felt, followed by slight hæmoptysis, showing the development of embolic phenomena. For some time she continued in this state, and then slowly improved, until, at the end of three months, she was well enough to leave hospital.

This is the usual run of cases of the cardiac type. Patients with valvular disease, most frequently aortic, come in with failing compensation, when they begin to have slight irregular fever, an evening increase of two or three degrees, with cardiac pain, distress, and restlessness.

Then pain in the region of the spleen, or pain in the back with hæmaturia, show the development of embolic troubles. Gangrene of the foot or hand may occur from embolisms in the limb vessels. Some may demur to calling such cases infective endocarditis, arguing that they are simply recurrent endocarditis with failing compensation. No doubt we may have all gradations between the milder and more severe forms. Various writers have referred to cases of this type which have lasted for from six to eighteen months. Here, if recovery takes place in any form of infective endocarditis, do we see it. I think I have seen such a case.

As regards treatment there is little to be said. It is a disease in which preventive measures are of more moment than active treatment, when the disease is declared. It behoves us, therefore, to warn those with old valvular lesions not to expose themselves unnecessarily to infective diseases, such as erysipelas, diphtheria. etc., and to see that their sanitary surroundings are above suspicion. Any source of autogenetic infection should be inquired into, and, if present, seen to, such as an otitis or chronic gleet. They should also lead a careful and well-regulated life, for debilitating influences and dissipation are powerful factors in predisposing to the disease. When the disease is declared, various remedies have been used without much success. Sansom recommends sulpho-carbolate of soda in 20-gr. doses every four hours. When the temperature is rising to a dangerous degree, I have given quinine in 10-gr. doses, with cold sponging or the ice-pack, and salol in 5-gr. doses in the intervals. This treatment seemed to relieve, at least. In the more chronic cases, arsenic, with or without quinine, is certainly of value, and I have seen a case recover in which these drugs were used. The treatment with the antistreptococcus serum ought to prove encouraging, for the organisms which cause the mischief most frequently are streptococci and staphylococci. Yet it appears there are important differences between streptococci of different origin, and while one serum will protect against one particular streptococcus, against another it is found to possess no protective power whatever. It is possible that the poisons produced by the various streptococci may be essentially of the same nature, and if, as in diphtheria, an antitoxin serum could be produced, better results might follow. For it is to be remembered, anti-streptococcus serum at present possesses bactericidal rather than antitoxic properties.

I have had no experience with this method of treatment, but apparently some encouraging results have been achieved. Nor have I with a later treatment, that with nuclein, which has been advocated in all microbic affections. This is derived from young yeast cells, and the rationale of its use is, that it assists the germicidal action of the white blood corpuscles. One-half to one teaspoonful of nuclein solution, 5 per cent., may be given thrice daily, in a wine-glassful of water between meals, or hypodermically, 20 to 30 minims, diluted with an equal part of freshly boiled ·6 per cent. salt solution.

This nuclein solution might be given a trial in a disease the acute cases of which are so desperate.

PULMONARY TUBERCULOSIS IN YOUNG CHILDREN.[1]

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I PROPOSE to confine the few remarks I have to make to the consideration of tuberculosis of the lung, as it is seen in children under the age of 10 years, for it is only during this early period of life that the course, symptoms, and pathology of the disease differ from the well-known conditions met with in older patients.

The chief differences met with may be considered under three heads—(1) Physical signs; (2) general symptoms; (3) course and termination.

With regard to the first, namely, the *physical signs*, the peculiarities are due partly to the variation in the distribution of the tuberculous material, and partly to the special character of the changes in the lung itself. The main feature to be noticed in the distribution is its irregularity, and this is due to several causes, one of the most important of which, and one which is common to most diseases of early childhood, is the absence of complete differentiation of actively growing organs; that is to say, the want of fixation of shape and function, which is to be seen not only in separate organs, but in different portions of the same organ. This want of fixation of localised habitat is strikingly seen in skin affections; thus the wandering form of erysipelas is but rarely met with after the age of early childhood, eczema is almost as common upon extensor as upon flexor surfaces, and scabies is by no means confined to its usual areas. Again, with regard to the nervous system, general convulsions may occur as the result of a slightly abnormal blood state, or of a localised irritation of the intestinal tract. The same want of adherence to any fixed laws is seen in the variations in the temperature in children, for whilst on the one hand some trivial gastric or intestinal ailment may be associated with a temperature of 103° or 104° in a severe disease like enteric fever, the illness may run its whole course with but a slight rise of temperature, or with a temperature so irregular as to deprive this symptom of any diagnostic import. This want of localisation of disease to special areas, is well seen in acute pneumonia in young children, in whom consolidation occurs with almost equal frequency at apex, base, and root. As in pneumonia, so in phthisis. In its irregular distribution in the lung, tubercle only corresponds with other diseases in young children; but there is a special peculiarity to be taken into account in phthisis, namely, that the apex of the lung is hardly if at all more liable to be affected than the base, and less often attacked than is the root. The chief reason for this peculiarity is, in my opinion, that there is less extrathoracic lung in a child than there is in an adult. The frequency with which the root is the seat of disease is accounted for by the fact that the primary focus of infection is, in so many cases, a caseous bronchial gland, which by no means infrequently actually encroaches upon the lung, and thus causes the direct invasion of its tissue by the tuberculous mischief.

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[1] Read before the Leeds and West Riding Medico-Chirurgical Society.

With regard to the character of the process, it is generally a tuberculous, caseating, broncho-pneumonia. The patches are usually numerous, and originally separate ones may join together so as to form more or less extensive areas of consolidation. Cavitation, such as occurs in adults, is excessively rare, although in some cases the centres of the caseous patches may here and there be so softened as to present small excavations. When the lung condition is due to direct extension of the mischief from a bronchial gland, the diseased area may be localised to the neighbourhood of the root; but when this is not the case, the patches are, as a rule, widely distributed, with more or less healthy lung tissue between them. If very extensive, however, whole lobes, or even the entire lung on one side, may be rendered solid by the coalescence of neighbouring patches. The termination of the tuberculous broncho-pneumonic patches in caseation is due to the combined effects of the cellular infiltration of the lung parenchyma, and to the cutting off of the blood supply to the part, owing to the tuberculous infiltration and subsequent blocking of the blood vessels, and probably of the lymphatics. The vexed question as to the mode of spread of the disease I have not time to discuss; suffice it to say that, on the whole, the evidence I have derived from an examination of the closely similar condition met with in monkeys, inclines me to the view that a lymphatic rather than an arterial mode of infection probably occurs in the large majority of cases, such as those I am now dealing with. The further changes seen in the individual patches consist in the necrosis of the alveolar walls and the surrounding lung parenchyma, and in the conversion of the exudation within the alveoli into a granular and fatty mass, the cells losing their nuclei. The peculiarities of the physical signs need not detain me long, as, from what I have already said with regard to the pathology, the differences met with necessarily must occur. These signs are, in many cases, very indefinite, and in almost all cases misleading. Generally speaking, the signs are the same as in broncho-pneumonia, with one difference, namely, that in the majority of cases they do not at all correspond in degree with the manifestly serious condition of the patient. With regard to the ordinary adult symptoms of cough and hæmoptysis, the former naturally occurs as a result of the broncho-pneumonia, although I have observed cases with extensive lung disease in which cough has been almost absent. The latter, that is to say hæmoptysis, is comparatively rare, owing to the fact that the course is usually too rapid to permit of aneurysm formation or of erosion of vessels. The expectoration is, as in most lung affections in young children, frequently not available for examination, being scanty in quantity, and moreover being usually swallowed. It may be noted, however, that in some cases of phthisis in young children the expectoration is profuse, and is voluntarily ejected.

2. *General symptoms.*—Of these, the one to which I attach most importance is wasting, especially if it be associated with marked anæmia and progressive debility. In the majority of the cases the wasting occurs some time before the lung signs become evident, and during this period there has probably been an increase of size in the bronchial glands. At the same time tubercle may also develop in various organs, for it is very rare to find post-mortem that the disease is entirely pulmonary. The bronchial glands are so constantly affected, that Henoch, with his enormous experience, has stated that he can only recollect a few cases where they have been healthy. A point of very great interest with regard to the presence of caseating glands is the very long period during which the disease may remain latent in

these organs. A good instance of this is afforded by a case which recently came under my care in the Bradford Royal Infirmary. The patient, a boy æt. 17, when he came to the hospital, was found to be suffering from acute tuberculosis. On admission there was slight cough with scanty expectoration, considerable but not extreme emaciation, marked cyanosis, no dulness on percussion, shallow respirations with dilatation of the alæ nasi, rhonchi and coarse râles all over both chests, and considerable hyperæmia of the nasal side of the right optic disc. The history was imperfect; but, as far as I could learn, there had been convulsions on two occasions within the last few weeks, wasting with chronic cough, and occasional attacks of diarrhœa for some months, and acute illness for a few days. The patient lived for seven days, during which time the physical signs underwent no material change. The temperature remained persistently high, varying between 103° and 105°. There was pain on movement, slight occasional delirium, shallow superficial breathing, and incontinence of urine and fæces. At no time was the cough severe; there was no vomiting, and the intellect remained clear up to the end. The autopsy revealed tuberculosis of liver, spleen, kidneys, pleura, peritoneum, and pia mater, both at vertex and base; a tuberculous nodule in the right lateral lobe of the cerebellum, of the size of a large pea; tuberculous ulceration of the appendix vermiformis of the cæcum and of the transverse colon; disseminated tubercle throughout both lungs; no fluid in either pleural or peritoneal cavities; caseous, mesenteric, and bronchial glands, and a huge mass of caseous retroperitoneal glands. The existence of this mass of caseating glands in the abdomen indicated almost certainly, in my opinion, that the original infection must have taken place in early childhood, and that the general diffusion only occurred comparatively recently. The lung infection itself most likely only dated as far back as the commencement of the acute illness. The tubercles in the lungs, liver, kidneys, and brain, with the exception of the caseous nodule in the cerebellum, were grey miliary tubercles, whilst those in the spleen were yellow. Returning now to the consideration of the general symptoms, the temperature is usually raised, and may show morning remissions; but towards the end of the disease, especially in infants, it not infrequently becomes normal or subnormal. Night sweats may occur, diarrhœa is generally a marked and troublesome symptom; and, in addition to the anæmia, there is almost always great cyanosis, together with clubbed fingers, and the usual signs of pulmonary obstruction.

The course of the disease is almost invariably either acute or subacute, the patients dying within six months, or, at most, a year from the onset of definite signs of mischief. Death occurs either from exhaustion, diarrhœa, intercurrent broncho-pneumonia attacking parts of the lung previously healthy, or from tuberculous meningitis. A few cases seem to become stationary for a time, the patients ultimately dying of acute tuberculosis, whilst a still smaller number develop the signs of fibroid phthisis, and may live with impaired nutrition for years. In a certain very small proportion of cases, complete recovery takes place; but this is so rare, that, when it apparently occurs, I think the correctness of the diagnosis is to be doubted, unless tubercle bacilli have been actually found.

The differential diagnosis of the disease often, or perhaps I may say usually, presents much difficulty. Excluding the cases where the lung disease is only part of a general acute tuberculosis, the condition most likely to lead to error is that of non-tuberculous broncho-pneumonia. In my opinion, the only grounds upon which a positive diagnosis can be based in these cases, apart from finding tubercle bacilli, are the insidious onset, gradual wasting, and progressive anæmia and debility having occurred for some time before the lung symptoms have become prominent in the course of the illness. In some cases a positive opinion is well-nigh impossible, and, I suppose, few medical men have not at some time or other diagnosed as pulmonary phthisis a case which has ultimately turned out to be non-tuberculous broncho-pneumonia, or even apical croupous pneumonia, which has taken an unusual time to resolve. The converse mistake is far less frequently made. Another difficulty which occasionally occurs is in the distinction of phthisis, where the base chiefly or only is attacked from pleurisy with effusion. The following case, which was under the care of one of my colleagues when I was on the staff of the East London Children's Hospital, is a good instance of this difficulty:—The patient was 1 year old. There had been cough and wasting for several weeks, but the breathing was not much embarrassed at first. Absolute dulness was found over the lower half of the left chest, with somewhat bronchial breathing, but no added sounds. No fluid was found on exploration. In three weeks the child died, with increasing debility and some pyrexia, but with no change of physical signs. The left lower lobe was completely adherent to the chest wall, and universally caseous. The upper lobe was very slightly involved, and the other lung was only congested. The mediastinal glands were large and caseous, the mesenteric glands much swollen, and there were some tubercles on the surface of the spleen. In some other cases, and these are of great importance from the point of view of prognosis, the lung symptoms are masked by the existence of a tuberculous empyema.

The treatment, unfortunately, need not detain me long. In the early stages it is chiefly hygienic, dietetic, and climatic, though creasote, arsenic, hypophosphites, and cod-liver oil seem to do good in some cases, and certainly should be given; whilst in the latter stages it is purely symptomatic.

CLINICAL RECORDS.

ACCIDENT IN WHICH A CROW-BAR TRAVERSED THE VERTICAL DIAMETER OF PATIENT'S ABDOMINAL CAVITY: SURVIVAL FOR THREE WEEKS.

By A. C. MILLER, M.D., *Surgeon, Belford Hospital, Fort-William.*

THE manner in which this accident occurred was very peculiar. The patient, a strong young Irishman of 20, had been engaged "dressing" a railway embankment, in course of construction. Standing on the outside ledge, he was performing the duty by means of a long pointed crow-bar, when, suddenly, the instrument missed its billet, and the poor fellow lost his balance. Letting go his hold of the iron, the latter, turning heel downward in its course, first reached the bottom of the declivity, stuck fast in the ground, and presented its pointed extremity to the navvy as he tumbled after. The point entered the right thigh in front and emerged below the right shoulder posteriorly. A companion who witnessed the occurrence rushed to the patient's assistance; and, with some difficulty, succeeded in withdrawing the crow-bar.

The patient was then conveyed to hospital partly by locomotive engine and partly by trap for a distance of eighteen miles.

On admission he was found to be very collapsed; pulse weak and rapid, face cyanosed, extremities cold. Stimulants were administered in hot milk. Hot bottles were applied, morphia was injected hypodermically, and soon the patient recovered to the extent of permitting a detailed examination to be made. The point of the crow-bar had entered about 4 in. below the line of junction of the thigh to the pubis. The course was through the subcutaneous tissue of the limb, underneath Poupart's ligament, and through the abdominal cavity. The wound of exit was situated about 1½ in. below the angle of the right scapula.

There was not much bleeding from the wound of entrance. The femur was uninjured, and patient could flex and extend the thigh without difficulty. The femoral artery could be detected feebly pulsating to the outside of a swelling underneath Poupart's ligament. This swelling gurgled distinctly on pressure.

The tenth and eleventh ribs were found to be fractured and comminuted, and a splinter from the tenth had been thrust upwards so as to penetrate the pleural cavity. There was considerable oozing from the thoracic wound. The tissues around were emphysematous, and air passed freely in and out of the aperture. The wound was valvular; that is to say, the opening in the skin was at a higher level than the injured ribs, but on drawing the skin and subcutaneous tissue downwards, the fractured bones could be easily seen by electric lamp light. The splinter that caused the pleural wound was caught by forceps and removed. For an hour or two after admission there was considerable disturbance in the respiration, and aeration of the blood seemed to be carried on with difficulty. The pulse was extremely weak and irregular, and the face was deeply cyanosed. By and by, however, the respiration and circulation became quiet and regular. The patient slept at intervals, and in the evening stated that he felt no discomfort whatever. The temperature was 102°·2. Eighteen ounces of clear healthy urine were drawn off; one-fourth gr. morphia was administered hypodermically every four hours.

Towards morning on the following day (25th) vomiting set in. The patient said he was relieved by the emesis. The vomited matter consisted of bile-stained fluid, tinged also, slightly, with blood, and it was sour-smelling. The temperature fell to 99°; the pulse to 100. Flatus passed freely. The wounds looked healthy, and after being thoroughly irrigated with 1 in 40, were stuffed with iodoform gauze.

For several days the patient remained in much the same condition; vomiting being almost incessant, relieved occasionally by ice and sometimes by the application of a sinapism to the epigastrium. Morphia was given less frequently. The urine for the most part passed voluntarily and in normal amount. Rectal enemata gave no result. Then tympanitic distension of the abdomen began to set in.

On the 31st the patient's condition became very critical. He passed "a very restless night, much disturbed with vomiting, which is of a very offensive character, and resembles chopped parsley in appearance. Temperature subnormal, and extremities cold. Pulse small, slow, and compressible. Thoracic wound healthy. Wound in thigh dry and gangrenous." For twenty-four hours the amount of liquid ingested was 72 oz. During the same period 28 oz. of fluid were vomited, and 35 oz. of urine passed.

On the 31st January the bowels moved for the first time since the accident—an interval of seven days. The abdominal distension became less, and the vomiting not so constant. In the general condition, too, improvement followed. The facies became less anxious, the pulse quieter and more regular and full, and the temperature stood at normal; but later, again, the bowels became very troublesome. The stools were pea-soupy in character, occasionally interspersed with air bubbles. Bismuth, chalk, opium, and acetate of lead were given in various combinations to counteract the diarrhœa, but with only intermittent success.

The vomiting for a time disappeared after the occurrence of the diarrhœa. The pulse became small, rapid, irregular, and feeble. Temperature pursued a fairly normal course. The patient's features became more and more anxious, emaciation progressed, and the abdominal distension increased.

The thoracic wound discharged a large quantity of pus, and daily irrigation with carbolic solution was carried out. A drainage-tube was inserted. The femoral wound became healthy and tended to granulate.

On the 5th January the patient began to expectorate a peculiar slaty-greenish spit, tinged at times with blood. He complained of pain in the right side, in the region of the wound; and it was noted that he felt much relieved after each dressing, when large quantities of pus were got rid of.

The patient's face and nose, eyebrows, and forehead became covered with a thick herpetic eruption.

Throughout, the patient was very keenly conscious, and was distressed chiefly by the persistence of the abdominal swelling. Turpentine internally, and externally combined with fomentations, was employed for the reduction of the distension, but without effect. There was no tenderness on pressure. On the 7th, the protrusion of bowel into the track of the femoral wound could be distinctly palpated as a hernia, and was easily reducible. On the 8th, the patient had a syncopal attack, after which his condition remained critical from weakness. He ingested large quantities of milk, but, owing to the recurrence of vomiting, it was deemed advisable to a large extent to substitute alcohol and ice.

Exhaustion daily increased. On the 11th—to indicate the intractable nature of the intestinal irritation—ten liquid motions were recorded. The patient succumbed on the 14th. At the autopsy the following conditions were noted:—

Body extremely emaciated. Herpetic eruption on upper and lower lips. External wound on right thigh; oblique upper margin 4 in. below pubic spine, 1½ in. in vertical measurement, 2 in. transversely. External wound in right infra-scapular region in line with angle of scapula, occupying partly the sixth, and the seventh and eighth interspaces. Vertical measurement of wound, 2 in.; transverse, 1¼ in. On opening into abdomen, the peritoneum is found thickened and adherent to the abdominal wall.

The coils of intestine are distended and matted together. The omentum is represented by a thin membranous layer, with only traces of fat on its surface. A line of redness marks the upper line of adhesion between the coils of intestine.

In the right iliac region, the bowel, peritoneum, and abdominal wall are closely adherent, and there is deep adhesion between the intestinal coils. The hernial protrusion into the cavity continuous with the external opening in the thigh consists of small intestine glued together, and extremely difficult to separate. The funnel-shaped tube containing the hernia is wider at its proximal than at its distal end, due no doubt to the downward pressure of the bowel. The peritoneum is prolonged over the protruding intestine and is adherent to the muscular wall of the hernial cavity.

The cæcum at its upper extremity is very deeply injected. In the process of separating adhesions between the bowel and liver, a tear of the size of a threepenny-piece was made into the upper wall of the duodenum, and from this issued a large quantity of intensely yellow thin fluid.

The liver is enlarged. On its lower aspect, in the middle line and near the external border, is a torn, ragged surface, about 2½ in. in its longest diameter, *i.e.* transversely to the organ. A lacerated wound, somewhat similar in size and appearance to the former, is found upon the upper external aspect of the gland.

There is a wound in the thoracic wall below the insertion of the diaphragm, situated about 2½ in. external to the vertebral column, 2 in. in its vertical and 1 in. in its transverse extent. The tenth and eleventh ribs are fractured and comminuted in this situation.

The right pleural cavity is found to be occupied by a large quantity of sero-purulent fluid.

REMARKS.—The fact that no immediate penetration of the bowel had taken place is an illustration of the extreme elasticity, compressibility, and lissomeness of the intestine. The lesion in the upper duodenal wall was caused by that portion of the tract being pressed against the denser liver tissue by the advancing weapon. It was evident that adhesions were formed and forming at the site of this injury, and in all likelihood the partial lesion here would not have presented a serious obstacle to recovery. The lethal issue was, in my view, brought about by the toxæmic effects resulting from the peritonitis, from the hepatic rupture (disturbance of liver function immediately arising therefrom), and from the presence of septic fluid in the thorax.

A CASE OF PERFORATED GASTRIC ULCER—OPERATION—RECOVERY.

By W. J. CANT, L.R.C.P., M.R.C.S., *Honorary Surgeon, Lincoln County Hospital.*

C. H., æt. 17, was admitted into the Lincoln County Hospital at 4·30 P.M. on 30th March 1899, suffering from urgent symptoms of a perforated gastric ulcer, which had occurred late the previous night. She was very collapsed, and her temperature was 102° F. Four years previously she had been taken ill with epigastric pain and vomiting of "coffee ground" material, and had vomited blood occasionally since then.

I operated at 9 P.M. on the day of her admittance. $CHCl_3$ was given, and a median incision was made. Bubbles of gas were at once seen, and there was some peritonitis over the stomach and intestines, as well as particles of food in the abdominal cavity. A perforated ulcer the size of a threepenny piece was found upon the anterior wall of the stomach at the œsophageal end, occupied by a semi-detached slough and surrounded by much induration. The ulcer was closed with a double row of Lembert's sutures; the abdominal cavity was thoroughly cleansed, and the particles of lymph sponged off; iodoform was insufflated, a drainage tube introduced, and the wound closed and dressed.

After the operation the temperature was 100° F. The patient was restless and vomited twice during the night. She had nourishment per rectum. Next day the wound was dressed, as there had been a great deal of oozing. The patient was much better, although she vomited slightly four times during the next four hours.

The following day there was marked improvement, and no pain or vomiting; the wound was again dressed and the tube taken out. Later Valentine's extract with iced water was given alternately with the nutrient enemata. There was vomiting once again, but no blood, and recovery was rapid. On the fifth day after the operation the nutrient enemata were stopped, and peptonised milk and Benger given. The stitches were removed on 19th April, and the wound healed perfectly. The ordinary hospital diet was given on 3rd May, and patient left hospital cured on 17th May. On 20th June she was last seen, and was in perfect health.

A CASE OF URETHROTOMY FOR STRICTURE.

By Mark Wardle, L.R.C.P. & L.R.C.S.Ed., Bishop Auckland.

The interest of this case lies in the fact that a procedure was adopted which, so far as I know, is new.

The patient, a fairly healthy man æt. 40, had suffered from stricture for many years. He had been under several doctors, and when admitted to the Union Hospital was able to partially empty the bladder by great effort in a small dribbling stream. He had had catheters inserted many times, and was (in consequence) rich in false passages. After prolonged and careful effort, I was quite unable to get any size of catheter into the bladder. I therefore, on the 12th June, placed him under an anæsthetic and passed a No. 4 elastic catheter past the first stricture, and, as I hoped, into the commencement of a second. Putting him into the lithotomy position, I endeavoured to localise the point of the catheter, intending to cut down on it, and then to open up the stricture and pass the catheter on into the bladder. It was, however, quite impossible to feel the catheter point. I therefore steadied the urethra with the forefinger, and cut down to the point where I guessed the stricture to commence. I was thus able to easily enter the urethra, and then passed a director into the bladder. The catheter could then be readily felt in a false passage. I then passed a No. 9 elastic through the wound into the bladder, and dividing the wall of the false passage brought the point of the No. 4 out of the wound. After taking off the bone head of the No. 9, I inserted the No. 4 into the No. 9, and, using the smaller one thus as a guide, was able to push the No. 9 outwards along the urethra and through the meatus, with the greatest ease and quickness. The wound was carefully closed by a deep continuous suture and superficial interrupted ones. It healed without any untoward symptoms, and the catheter was allowed to remain until the seventh day. A No. 10 was then introduced without difficulty, and left for twenty-four hours. After that the patient emptied his bladder naturally in a full stream without difficulty. The No. 10 was passed once a day until he was discharged cured on the eighteenth day.

In cases of multiple stricture this method seems to me to present a quick and fairly easy method of getting a good-sized catheter *in situ*, the smaller one, on being passed into the larger, forming a safe and certain guide upon which the larger can emerge.

REVIEWS OF
BRITISH AND FOREIGN LITERATURE.

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Renal Growths, their Pathology, Diagnosis, and Treatment. By T. N. Kelynack, M.D. (Vict.), M.R.C.P. (Lond.), Pathologist, Manchester Royal Infirmary. Edinburgh and London: Young J. Pentland.

It has long been recognised by pathologists that, from the surgical point of view, they have succeeded in throwing far too little light on the nature and pathology of renal growths. The reason for this appears to be that, up to the present, few systematic attempts have been made to examine at all carefully the basis of classification of such growths, or to bring together even the information that has already been collected. Pathologists and surgeons alike, therefore, will welcome in Dr. Kelynack's work on renal growths, their pathology, diagnosis, and treatment, not only a mine of information, but a systematic attempt—an attempt which all will agree has been successful—to evolve from the chaos of isolated observations, scattered over an enormous area of literature, a more or less reasonable classification; a classification that may be of use to the surgeon in guiding him as to the operative treatment necessary in any individual case, and also in giving him indications as to when it is in the interests of the patient that the tumour should be left alone.

There has been so much difference of opinion as to the method of development, and the origin of the different structures and tissues of the kidney and of the suprarenal capsule, that the same tumours have been described as perfectly different forms by different observers, the suggested source of a tissue rather than the exact nature of the tissue as seen under the microscope often guiding the reporter. We hold that such descriptions are of comparatively little value, and that such evidence must be looked upon as "tainted." It seems far more important that we should have a number of accurate descriptions, carefully classified, than that we should have theories brought forward to account for the appearances presented, however plausible such theories may be. Indeed, one cannot help feeling that, as regards new growths of the kidney and of the adrenal bodies, especially during the early stages of their growth, we have almost as much to learn from them concerning the development of the organ as we have from any theory of development concerning their nature.

Dr. Kelynack has conferred a very great benefit on pathologists in accentuating the fact that loose nomenclature has interfered so materially with the advance of our knowledge of renal growths. He has further brought together an extraordinary number of cases of renal growth, and has classified them most admirably, describing the various methods of grouping hitherto adopted, the frequency of these growths, their etiology, especially instancing embryonic defects, traumatism, calculus, and the various predisposing influences. He then gives very full descriptions of the various forms of tumour met with in the kidney, and describes, more fully than is done in any English work at present published, the histological characteristics of primary growths, whether innocent or malignant, and of secondary deposits. The adrenal growths are similarly treated. The latter part of the work consists of a very full account of the clinical features, symptoms, diagnosis, and treatment of these various growths; whilst the appalling bibliography given at the end of the work affords evidence, first, of the enormous amount of material that the author has had at command, but also, unfortunately, of the impossibility of identifying with any degree of accuracy a large proportion of the tumours that have been described. The book is convenient in size; the descriptions, though full and lucid, are never too long and tedious; and the illustrations, taken as a whole, are the best that we have seen in any work of this kind. We commend it very heartily to all who take any interest in this important subject.

G. Sims Woodhead.

Clinical Diagnosis. By Dr. Rudolf v. Jaksch. Fourth Edition. Specially revised and enlarged by the Author from the third English Edition of the Translation by James Cagney, M.A., M.D. London: Charles Griffin & Co., Ltd. 1899.

This well-known work on clinical diagnosis requires no words of commendation from us. It is recognised as the standard treatise on the subject with which it deals. The present edition is brought well up to date by the author himself, who has lost a valued coadjutor by the untimely death of Dr. Cagney, the able translator and editor of the previous English editions.

We can safely recommend the book to clinical workers as a clear and trustworthy exposition of the most approved methods of conducting clinical research.

We must confess to a little surprise on reading that the consumptive ward of a hospital possesses an atmosphere crowded with tubercle bacilli, and to find it seriously stated that it does not necessarily follow from the presence of the tubercle bacillus in the sputum that a fatal termination is impending. Dr. v. Jaksch's experience of pulmonary tuberculosis is probably extensive, but it is certainly peculiar. He has met with cases, he says, in which the patient with tubercle bacilli in the sputum has eventually recovered, but they are very rare. It is possible that these remarks were made some years ago, and have escaped the author's eye in revising the present edition. We hope that Dr. v. Jaksch will be able in the next edition to give a more hopeful prognosis of pulmonary tuberculosis, and to paint a less imaginative picture of the atmosphere of the consumptive ward.

Hector Mackenzie.

Diabetes Mellitus and its Treatment. By R. T. WILLIAMSON, M.D. (Lond.), M.R.C.P. Edinburgh and London: Young J. Pentland. 1898.

DR. R. T. WILLIAMSON may justly lay claim to have written one of the most complete and instructive books on diabetes mellitus and its treatment to be found in the English language. Dr. Williamson is peculiarly fitted to write such a work. He is the author of numerous memoirs on the same subject, showing much patient original research and accurate clinical observation. He has diligently studied the work which has been done by other countries, and has carefully sifted the wheat from the chaff. The whole book is well worth perusal by the student and practitioner alike, who wish to learn all that is at present known about this most interesting malady.

Dr. Williamson's observations on the tests for sugar in the urine are of great practical importance. Nothing is easier than to recognise the presence of sugar when it occurs in considerable amount. Many practitioners, however, do not realise the difficulties which surround the detection of small quantities of sugar in the urine. A slight reduction of Fehling's solution is often taken to mean that sugar is present when no such inference is justifiable without further tests. This may be a matter of great moment to the person whose urine is examined when the question of life assurance is concerned. The three tests which Dr. Williamson considers most useful and certain in practice are: Fehling's solution, fermentation, and phenylhydrazin, and we know of no simpler or more conclusive means of deciding whether the urine contains a small quantity of sugar or not than the combination of these three tests, as the author describes.

Dr. Williamson gives a simple method of distinguishing diabetic from non-diabetic blood—the decolorisation of methylene blue by diabetic blood. This may be a great help in cases of doubtful diabetic coma, where there is a difficulty in obtaining a specimen of the urine. The test, according to the author, is so sensitive that it can be employed with success when only a *drop* of blood can be obtained.

The chapter on glycosuria, from various causes, strikes us as perhaps too short. The very interesting subjects of alimentary, toxic, and clinical glycosuria might, with advantage, have been discussed at greater length. The exact relation of carbuncle and glycosuria, for instance, is not at present properly understood, and it is not at all certain that glycosuria associated with carbuncle is always true diabetes.

Dr. Williamson's remarks on the treatment and management of a case of diabetes are sensible and practical, and we concur in the main with the rules he lays down. There is too great tendency to concentrate attention on the amount of sugar excretion, and to lose sight of the fact that, while the amount of urine and of sugar may be diminishing, the patient may yet be steadily losing ground.

The author sides with those who think that in the severe forms of the disease a very strict diet is injurious. He looks upon Gerhardt's reaction, the dark brownish red coloration produced by the addition of solution of perchloride of iron to the urine, as a useful sign that a case is a severe one.

There appears, the author contends, to be good evidence that the rigid exclusion of carbohydrates from the food in severe cases has a tendency to bring on diabetic coma, and that coma may sometimes be averted or arrested by the addition to the diet of small quantities of starchy food.

In the severe form of diabetes the author advocates that fatty food, such as cream and butter, should be given in large quantities, and nitrogenous food in moderate quantities, and that a certain amount of starchy food is a distinct advantage.

We have observed very few errors which have escaped correction. At the end of each chapter there is an adequate list of references. A select bibliography of this kind is exactly what the reader requires.

HECTOR MACKENZIE.

Transactions of the American Dermatological Association at its Twenty-second Annual Meeting, held in Princeton and New York, 31st May and 1st and 2nd June 1898. *Official Report.* By JOHN T. BOWEN, M.D., Secretary. Concord, N. H.: The Rumford Press. 1899.

A CLOSELY printed volume of 166 pages is not a bad record of the work of an Association meeting for only three days. There are various papers of interest among those read, the longest being one by Robinson on the etiology and pathology of lupus erythematosus. He concludes, after a study of the observations of others as compared with his own, that it is "a chronic inflammatory disease of the cutis, with special histological characters, as shown by the changes in the blood vessels—new blood vessels in the affected area, lymph vessels and lymph channels, and the new formation of an adenoid-like tissue—reticular tissue—the presence of mononuclear and absence of polynuclear cells in the cell infiltration; and these changes must depend upon the presence of a poison generated *in loco.* In other words, lupus erythematosus is a local infective process—a granuloma." White follows with an article on its amenability to treatment. He starts by saying that this is "a disease which, although not incapable of recovery, is the most refractory to treatment of all cutaneous affections." After forty years of observation of cases, of experimentation and reading, he holds to-day the same well-nigh hopeless opinion. It is no new thing for distrust of remedies to come with age—we have had one example at least in recent literature—but it is fortunate that all do not maintain the same pessimistic views as White. The disease is undoubtedly often obstinate, yet many cases yield much more readily to treatment than some cutaneous disorders which could be named. A contribution on the so-called premycosic stage of mycosis fungoides, by Hyde and Montgomery, is an interesting analysis and résumé. They believe that "the facts point to a systematic origin for mycosis fungoides, as definitely and as unmistakably as a glycosuric xanthoma points to a condition which could by no possibility have been explained by an examination merely of its cutaneous lesions." Of the single cases recorded, that by Gilchrist is the most valuable. This was one of lichen scrofulosum, and the excellent illustration corresponds exactly to Hebra's original description and plate. The tuberculous nature of this rare ailment was clearly proved, while it yielded rapidly to hypophosphites and cod-liver oil. The transactions are copiously illustrated, and prove that the study of dermatology is prosecuted with undiminished energy in the United States.

W. Allan Jamieson.

Atlas and Epitome of Operative Surgery. By Dr. Otto Zuckerkandl, Privat-docent in the University of Vienna. Authorised Translation from the German. Edited by J. Chalmers Da Costa, M.D. London: The Rebman Publishing Co. Limited. 1898.

This is an American translation of Zuckerkandl's handy "Atlas and Epitome of Operative Surgery." The work is a favourite text-book with German medical students, and, to a certain extent, deservedly so, for it is brief, explicit, reliable, and profusely illustrated. The author, in his preface, defines the scope of the work. "The Epitome is intended as an elementary work for students. For this reason, those groups of operations, whose practice upon the cadaver forms the basis of practical instruction, are described in detail, and illustrated in their most conspicuous aspects. Other operations, whose performance falls largely to the lot of the skilled surgeon, and whose practice upon the cadaver appears less important, are described concisely." Thus, in keeping with the above, we find that to ligation of vessels, amputations, resections of joints, a sufficiently full description is given, while many important major operations, which come almost exclusively under the care of the operating surgeon and do not lend themselves readily to practice on the cadaver, are either described in the briefest manner or are entirely omitted. The descriptions of some operative procedures strike us as far too bald; thus, for the important subject of the radical cure of inguinal hernia, less than two small pages are considered by the author to be sufficient, and Bassini's is the only operation described, with the exception of a few lines in very small print which indicate some of the steps in Kocher's operation. No mention is made of the methods of Macewan, Ball, Barker, etc.

We regret to notice many important omissions; thus, no mention is made of any operation upon the eye, the ear, the female genital organs, the spine, etc. Surely every student's handbook of operative surgery should give a description of such operations as enucleation of the eyeball, opening the mastoid antrum, hysterectomy, and laminectomy, though we are bound to admit that the majority of German text-books on operative surgery agree in omitting these subjects.

The work is profusely illustrated, having twenty-four coloured plates and 217 illustrations. Of the coloured plates we can hardly speak too favourably, as they are of a uniform excellence. Of the illustrations some are fair, but most are indifferent.

We must take exception to such expressions as "*bloody* operations for hernia," "*enucleation* of the foot at Chopart's joint," "*unilateral strumectomy*," and to the spelling "*goiter*." This last is entirely unjustifiable, and is not used in any other American translation. On the whole, whilst the coloured plates are exceedingly good and the text accurate as far as it goes, there is a sense of incompleteness about the work which prevents our giving it a very cordial recommendation to British students of medicine.

HERBERT F. WATERHOUSE.

Dictionary of Medical Terms: English-French. By H. DE MÉRIC. London: Baillière, Tindall & Cox. 1899.

THIS dictionary should fill a most useful position among extant dictionaries of medical terms. In itself, and in what it aims at being, it is most excellent; in other respects it is rather irritating, because it can afford but little help to any one translating from the French language into English; in fact, it is better suited for the translator of English into French. However that may be, there is no doubt that an official means of verifying the exact French equivalent for technical English words will be of the greatest service to members of the profession who require to render any of their ideas in the French language, or who, aided by the context, may look out under the English heading suggested by it, the true meaning of the doubtful French words. The dictionary itself appears to be most complete; for instance, we notice the inclusion of "John Chiene's method," the method of Chiene for localising the fissure of Rolando; Chiene's operation for *genu valgum*; Annandale's operations, five in number; Duncan's; Syme's, of which there are nine separately included; and Spence's operations, rendered individually into their French equivalents. The terms translated appear to include many words of the most recent introduction; we notice, however, the absence of "neurone," for example.

Should the author follow this work with a companion volume containing the English equivalents of French technical terms and expressions, the debt of the profession in this country to him will be largely increased.

A. LOCKHART GILLESPIE.

The Anatomy of Labour, as Studied in Frozen Sections, and its Bearing on Clinical Work. By A. H. F. BARBOUR, M.D., F.R.C.P.Ed. 2nd Edition. Edinburgh and London: W. & A. K. Johnston.

THE work was originally issued ten years ago as a descriptive hand-book of frozen sections, as exhibited in Dr. Barbour's own Atlas, and in the publications of other workers in the same field. In the edition now under notice he has added descriptions of, and deductions from, a series of no less than twenty-five new sections, and he has the satisfaction of finding that these confirm and extend the opinions previously formed. It is impossible, without drawings, and in the compass of an ordinary review, to give the general results of these painstaking and admirable studies. But "in its clinical bearing" attention may be drawn to the demonstration of the variability of the height of the sacral promontory vertically, above a line drawn horizontally backwards from the symphysis pubis; the measurements, apparently in normal pelves, are given from 2·6 to 3·8 in. In the second stage of labour, the bladder is one-half abdominal and one-half pelvic, a demonstration not quite in accordance with ordinary clinical teaching. The description of the occipito-posterior position is difficult to follow without a drawing; its clinical importance justifies the hope that this may be added to a future edition. As many of the sections described are foreign, with metric measurements, it would simplify the work for reference if Dr. Barbour's own measurements were given throughout in centimetres as well as inches.

E. H. L. OLIPHANT.

Wesen, Ursache und Behandlung der Zuckerkrankheit (*Diabetes Mellitus*). By Dr. ALBERT LENNÉ. Berlin: S. Karger. 1898.

THIS is a closely-reasoned volume, so far as those aspects of diabetes mellitus which affect the general treatment of the disease and the alterations of metabolism caused by it, go, but it is by no means a complete monograph on the subject. It forms the outcome of Dr. Lenné's experience of the malady, as seen by him at Bad Neuenahr. The portion of the book which lacks fulness, though this is only to a comparative degree, is that which deals with the clinical diagnosis and tests, especially the account of the reactions liable to lead to a mistaken diagnosis of glycosuria. On the other hand, many of the facts detailed are of great interest and value. The author urges strongly, and this perhaps is the most suggestive statement in the book, that the diet of diabetics should not exceed in bulk that given to healthy individuals, provided that the output equals but does not exceed the intake; should more food be imperatively called for, the diet scheme must be faulty. Another important point which he advances consists of an opinion, which he strives to support by a number of experiments, that an excess of nitrogenous food is as bad for diabetics as surplus carbohydrates can be. In fact, he appears to be rather in favour of giving more carbohydrates than is usually thought right, provided that they be given in smaller quantities at a time and oftener. At the end of the book, useful tables, based upon König's figures, are added, giving the constituents of numerous articles of diet, solid and liquid. An excellent index closes the volume.

A. LOCKHART GILLESPIE.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF

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THE DIET OF CHILDREN.

LAST winter an account of several of the recent additions to the artificial food substances was given in this section (December and February). It will be worth while perhaps to continue the subject in relation to artificial foods for infants, and to the subject of infant feeding, both in health and disease. Numerous papers and books have appeared lately dealing with this. Moritz (Stuttgart, 1898), in an extremely clear and precise work, treats of it; so also Biedert ("Die Kinder-Ernährung," 1897).

Biedert, in this his last edition, especially calls attention to Schmidt's milk pump, and to the diet of children born before full time. In the first month, infants should be fed, he says, every two hours; from the second month, at two and a half to three hours' interval. The addition of any extra articles of diet does not commend itself as reasonable to him until after several months; while he terms any sudden change from milk food to mixed diet, before the end of the third or fourth year, "a daring step."

Proceeding to consider artificial foods, he recommends first, dilution of milk with water, until the resulting solution contains 1 per cent. of casein, to which sugar, not necessarily milk sugar, is to be added up to 5 or 6 per cent. If there is any tendency to diarrhœa, the water and milk should be boiled. He does not approve of the higher proportions of sugar recommended by Soxhlet, Heubner, and Hoffman, as they are apt to cause looseness of the bowel, and to prevent proper assimilation of the milk. A table with the percentage composition of a large number of the artificial foods at present in the market, with their heat values, is one of the most useful items in this book.

Heubner (*Berl. klin. Wchnschr.*, 1897, No. 21) gives one part of water to two parts of cow's milk, with proper addition of milk sugar, as affording the same number of calories as mother's milk, and states that this preparation is very well borne. Absolute purity of the food, and an exact approximation in amount to that which is normally taken by a child on the breast of corresponding age, are the points specially to be aimed at.

Keller (*Centralbl. f. innere Med.*, Leipzig, 14th January 1899), as the result of numerous researches, comes to the conclusion that the addition of carbohydrates in considerable amounts to cow's milk increases the absorption and utilisation of its nitrogenous constituents, and is of especial benefit when any inflammatory condition of the stomach or bowels is present.

Schlesinger (*Therap. Monatsh.*, Berlin, 1898, No. 12) writes concerning the best results which can be obtained from the artificial feeding for infants; they depend upon provision of chemically and bacteriologically pure milk; proper knowledge of the capacity of the infant stomach at different ages, and the corresponding limit in the amount of food proper for each meal; and, lastly, consideration of the total quantity of food elements which is naturally ingested by an infant nursed on the breast. These conditions are indispensable. The only rational method of feeding a child upon cow's milk is to render it beforehand equal in nutritive value to that of human milk.

Mayer (*Berl. klin. Wchnschr.*, 1898, No. 19) finds Rose's artificial milk to be almost identical in composition with human milk. Its components before being mixed are individually sterilised. The casein in it coagulates in particularly fine particles, and can be completely altered by the artificial pancreatic digestion within two or three hours. This preparation, he says, is well borne and easily digested.

Gregor (*Deutsche med. Wchnschr.*, Leipzig, 1898, No. 40); K. Fischl, *Med. Wander-Vortr.*, Berlin, 1898, Heft 53); W. Knopfelmacher (*Beitr. z. klin. Med. u. Chir.*, Wien u. Leipzig, 1898, Heft 18); H. Finkelstein (*Ztschr. f. Krankenpfl.*, Berlin, April 1898); M. Rubner and O. Heubner (*Ztschr. f. Biol.*, München, Bd. xxxvi. S. 1). These authors treat of the connection between the artificial dietary of infants, their natural food, and the affections of the alimentary tract. Gregor recommends, if a wet nurse cannot be obtained, that all children after their third month should be fed upon *Malzsuppe* and that this food be continued for one or several months. In younger, very feeble children, the same food diluted should be given, under careful personal supervision of the physician. Children of from 9 to 18 months, who show symptoms of rickets, may be fed upon *Malzsuppe* for a time, with the addition afterwards of some farinaceous foods, such as rusks, or of green vegetables. Healthy children brought up upon artificial foods, who fail to gain weight satisfactorily, if given *Malzsuppe* in addition to their previous diet, show quite as good results as after any other auxiliary food. In fact, the results obtained in the Breslau clinique, as shown by Gregor, demonstrate that *Malzsuppe* is a valuable artificial food for the nourishment of infants. Fischl considers that the composition of artificial milk foods at present obtainable, from their relative greater richness in nitrogenous bodies than human milk, help to hasten the growth of the brain, develop strength and production of warmth, and to strengthen the bones from their richer percentage of salts; while the artificial foods differ from cow's milk, which is, especially if obtained from the common yield of several cows, of constant composition. As cow's milk is usually given throughout the infant's earlier existence, diluted less and less with water as age advances, the percentage of its constituents increases, but the proportion one to the other remains the same, unless addition of artificial preparations be made. The necessity for these additions, to so modify the milk that the physiological needs of the growing child may be fully satisfied, is insufficiently comprehended, and seldom recognised in practice.

SURGERY.

UNDER THE CHARGE OF

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CONGRESS OF GERMAN SURGEONS, BERLIN, 1899.

Spreading Gangrene.

Lindenthal and Hitschmann of Vienna have studied six cases of this disease, for which they employ the name *gangrène foudroyante*, introduced by Maisonneuve. It is to be regarded as a wound infection, characterised by progressive necrosis and formation of gas in the tissues. It usually follows upon severe injuries which are infected with dust or earth. The injury is not necessarily a severe one, as the disease has followed upon the prick of a needle. It spreads rapidly along the lymphatics, and causes death by intoxication. The temperature may be normal or subnormal. After death the internal organs show cloudy swelling, parenchymatous degeneration, and hæmorrhages in the serous membranes. There may be post-mortem development of gas within the blood vessels and internal organs. During life, however, the bacteria in the circulating blood are rapidly destroyed. In the area of the gangrene the necrosis is specially marked in the muscles.

The disease is to be differentiated from phlegmonous inflammations; there is an absence of any noteworthy infiltration and of suppuration; the tissues merely lose their nuclei and cease to stain. Mixed infections occur, in which the gangrene is complicated with inflammation and suppuration. In five of the six cases investigated they found an anærobic organism; it is a fairly large, plump bacillus, with rounded ends; it stains readily with all aniline dyes and by Gram's method; it is immobile, it has no capsule, and it does not form spores. They succeeded in cultivating it from the human intestine and from earth. In guinea-pigs it gave rise to a disease which appeared to be identical with that in the human subject.

The bacillus described is very similar to that found by Fränkel and by Welch and Flexner in spreading gangrene.

In the sixth case investigated by the authors, the *Bacillus coli communis* was found; it would appear to be able to cause spreading gangrene only in the presence of diabetes. The other organisms capable of causing the disease are—the bacillus of malignant œdema, and, in very rare cases, the *B. proteus* of Hauser.

Clinically, the disease usually terminates in death; in a limited number of cases life may be saved by early amputation.

THE TREATMENT OF THE JOINT LESIONS IN BLEEDERS.

GÖCHT of Würzburg points out that hæmarthrosis is one of the most frequent symptoms of hæmophilia, and that it is met in young subjects usually during the period in which they are learning to walk. The frequency diminishes with increase in years. Injuries of various degrees of severity play an important part in their production. The knee-joint is most often affected.

As regards the treatment, when seen early, the joint is to be immobilised and compressed. Fomentations or ice may be applied externally. Early passive movements, along with massage and electricity to the muscles above the joint, promote recovery of function. Puncture of the joint and anything like forced movements are to be avoided. If there be repeated extravasations of blood into the joint, or if the latter be deformed, then splints and other forms of apparatus are to be employed. There is never any question of operative interference.

LOOSE BODIES IN JOINTS.

KÖNIG of Berlin has, during the last twenty years, observed and operated upon seventy cases of loose body. Of these, sixty were met with in the knee and elbow. As regards their etiology, trauma was responsible for sixteen, arthritis deformans for eight, and osteochondritis dissecans for thirty-six.

Those resulting from osteochondritis dissecans are chiefly met with in young subjects. Twenty-two out of the thirty-six were met with between the ages of 10 and 20; thirty-one were under the age of 30; only three were met with in females; and all of them were in the knee-joint. The onset of the disease in question is attended with vague pains in several joints, which are usually ascribed to rheumatism; in the course of time the pains are localised to the knee and elbow, and are associated with crackling, which may be audible. The functions of the joint may be impaired; in the elbow, extension is incomplete. Hydrops is not uncommon. At a later stage, when the loose body becomes detached, there are the characteristic symptoms of loose body. These may develop spontaneously, or after a twist or fall.

In thirty-six patients, König observed forty-eight "loose bodies"; of these, twenty-seven were quite loose, the remaining twenty-one were still more or less adherent (elbow—six loose, twelve adherent; knee—twenty-one loose, nine adherent). Twelve of the adherent bodies lay more or less securely in their "nest," the remainder were attached by a pedicle.

The relations of the "body" to the articular surface from which it is derived present three stages—first, a stage in which the body still corresponds to the general articular surface; at its margins there is a more or less evident fissure in the cartilage; it may be easily displaced from its bed with an elevator, the latter tearing through the connective tissue which unites it to the subjacent bone.

In the second stage, the body is raised above the level of the articular surface, and is more loosely attached to its base by granulation tissue containing giant cells; as the body becomes more pedunculated, the surface from which it was derived becomes scarred over; it may be thus completely detached, or it merges into the third stage, in which it hangs by a stalk of varying thickness.

The bodies vary in size; they are usually convex towards the joint, and concave towards the bone. They consist chiefly of cartilage, but may contain a fragment of the subchondral bone. It is probable that these bodies may disappear spontaneously, as has been observed experimentally in animals. König has no doubt whatsoever that the disease is quite distinct from arthritis deformans. There are never any changes in the bones or cartilages characteristic of the latter disease. There is, at the most, a localised thickening of the capsule, or the formation of fringes. An important fact is, that the patients recover *a healthy joint* after removal of the loose body. It is equally certain that the bodies here described are not the result of trauma, although minor injuries may play a part in localising the disease and in bringing about the final separation of the body.

OBSERVATIONS ON THE CAUSATION AND TREATMENT OF TRAUMATIC EPILEPSY.

KOCHER of Bern, in an important paper on this subject, lays stress on the conditions which are essential for the cure of traumatic epilepsy by surgical means. There is, first, the removal of any apparent cause of the epilepsy, *e.g.* splinters and thickenings of bones, adhesions, scars, cysts, tumours, abscesses. Apart from these, which are generally recognised, Kocher regards any increase in the intracranial pressure as an important factor in the production of convulsions. He points out that the success of operations for epilepsy has been much greater in those in which the dura mater was opened than in those in which it had been left intact.

He is also inclined to believe that the cures which have followed excision of a portion of the cortex, as recommended by Hughlings Jackson and first practised by Horsley, are to be largely explained by the fact that the dura mater was freely opened in the course of the operation in question. The operation of trephining, with division of the dura, brings about a lasting diminution of pressure within the skull as a whole, and a local diminution in the area of the trephine circle, so that a kind of "ventilation opening" is provided. Schär and Beresowsky investigated Kocher's cases, both those which were cured by operation and those which again became subject to fits, and they found that all the cases which remained free from convulsions had retained a permanent ventilation opening, that is to say, the membrane closing the opening in the skull remained yielding or movable, becoming depressed when the intracranial pressure falls, and bulging when the pressure rises. In those which relapsed it was found that the trephine opening had entirely, or almost entirely, closed, either by bone or by tough scar tissue, which was quite as unyielding as bone. It is a remarkable fact, and one which is quite in harmony with these observations, that comparatively slight head injuries are fairly often followed by epilepsy, while severe, compound, and even depressed fractures of the skull, when submitted to operative treatment, are very rarely followed by epilepsy, the explanation being that the latter are frequently attended by permanent defects in the bone or dura mater, which are able to functionate as "ventilation openings."

Beresowsky has found that the dura mater has a good deal to do with the closure of trephine openings; when the dura is intact, bone is found on its external surface, which fuses with that round the edges, so that small defects are closed by bone. When the dura is excised or destroyed, there is no formation of bone, so that, if a permanent ventilation opening is desired, one should freely incise, or it may be excise, a portion of dura. Kocher maintains that aseptic scars and aseptic foreign bodies practically never give rise to epilepsy, unless assisted by some such accessory factor as increased intracranial pressure, either local or general. Injuries may result in epilepsy without the existence either of scars or adhesions. The epilepsy experimentally produced in guinea-pigs by repeated blows on the head, is the result of increase in the intracranial pressure, and it may be cured by trephining and providing a "ventilation opening."

All these observations corroborate Kocher's view of the etiological relationship between epilepsy and increase in the intracranial pressure. If it be accepted, we are able to understand the importance of cysts in the production of traumatic epilepsy, for they cause an increase, not only in the local, but in the general pressure within the skull; and it may be further observed that all extensive brain injuries, when closed in from without, are liable to repair by the formation of a cyst.

Apart from injury, any increase of fluid within the skull, *e.g.* from inflammation or tumour, tends to the production of epilepsy.

Influenced by the foregoing observations, Kocher, when operating for the relief of traumatic epilepsy, makes a small opening in the skull with Doyen's perforator, enlarges the opening with Arbuthnot Lane's forceps, then divides the dura in crucial fashion, and cuts off the corners of the resulting triangular flaps. When it is required to relieve a general increase in the intracranial tension, there are two methods available: in the case of cysts or accumulations of fluid within the ventricles, it may be necessary to establish drainage and to maintain the latter over a period of years; this is carried out most efficiently by means of a small silver tube passed through the opening in the skull; the alternative procedure is to make a large opening by Wagner's osteoplastic method, modified by paring the circumference of the flap so as to make it smaller, and at the same time removing a corresponding portion of the dura mater.—Reported in *Centralbl. f. Chir.*, Leipzig, 8th July 1899.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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Cæsarean Section with Transverse Incision of the Fundus Uteri.

Since the introduction by Fritsch in 1897 of the transverse fundal incision of the uterus in performing this operation, fifteen cases have been reported, with a mortality of 5 per cent. Five other cases are here recorded. Thumim reports the case of a woman, æt. 35, where the indication for the operation was a generally contracted rickety pelvis, and refers to the slight degree of hæmorrhage during the operation. Braitenberg's patient was æt. 33, and had craniotomy performed on three previous occasions. He also notes the slight hæmorrhage—ease of extracting the child—as the feet are most frequently at the fundus. He, however, quotes a case reported by Steinthal, where the operation was performed on account of obstruction from a subserous fibroid. After the limbs and part of the body had been extracted, the head became fixed by a firm contraction ring, and the operation had to be completed by the ordinary vertical incision, and subsequent Porro. The incision being parallel to the course of the blood supply, hæmorrhage is slight, and the wound closes firmly. Everke, however, is of opinion that by suturing a transverse incision, the blood supply to the part is so interfered with that there is some risk of necrosis and sepsis, but Johannovsky holds that the capillary circulation is not in the least interfered with. Perhaps the most important advantage is the avoidance of the lower uterine segment, the importance of which was pointed out by Müller years ago, who regarded it as immaterial whether the incision in the fundus was vertical or transverse. Seidentopf reports three cases—two for contracted pelvis, and the third on account of advanced cancer of the cervix. He also was satisfied with the operation—(1) On account of slight amount of bleeding; (2) ease of extracting the child; (3) firm contraction of the uterus. Perlis performed the operation on a patient æt. 27, with advanced cancer of the cervix.

The following would appear, from the cases recorded, to be the advantages claimed for this incision—(1) Less chance of escape of uterine fluids into the peritoneal cavity and infection of the wound from the vagina. (2) The fœtus is more easily extracted. (3) Less hæmorrhage during the operation—(*a*) The placental site is generally avoided; (*b*) the incision is made parallel to the course of the blood vessels; (*c*) the fundus is not so vascular as the uterine wall at a lower point (Nagel). (4) The risk of rupture of uterus at a subsequent labour is less than with the ordinary vertical incision. (5) From the thickness of the uterine wall at the fundus a firmer suture is obtained, and the organ is more under the control of the operator, if kneading is necessary to secure firm contraction.—*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 19.

CONSERVATIVE SURGICAL TREATMENT OF CHRONIC UTERINE INVERSION.

SPINELLI (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 19) quotes Brown as the first to advocate the reduction of an inverted uterus by a vertical incision through the posterior uterine wall, and introduction of the finger to dilate the constricting funnel. Küstner improved on this method by opening the posterior fornix by a transverse incision, dilating the constriction, and by manipulation returning the inverted fundus. If this is not sufficient to insure reduction, he incises the posterior uterine wall. Several cases are reported as successfully treated by Küstner's method. Kehrer has recently advocated reduction by incising the anterior uterine wall from the external os to middle of body, reaching to but not dividing the peritoneum. Spinelli finds that the posterior uterine wall is thickened, the anterior atrophied in cases of inversion, and that the round and broad ligaments lose their supporting function. As a consequence, after reduction there is a tendency for the uterus to become retroverted, where it may become fixed by adhesions between the incision in the posterior uterine wall and that through the posterior fornix, if Küstner's method has been employed.

To prevent such displacement and fixation, as well as a recurrence of the inversion, he performs colpo-cœliotomy anterior, and incises the anterior uterine wall. The inversion is thus reduced, and the fundus then fixed to the vagina in an anteverted position, as carried out by Dührssen. He describes a case so treated.

EXPERIMENTS ON THE SENSORY CAPACITY OF THE FEMALE GENITALS, FROM A FORENSIC POINT OF VIEW.

IN October 1896, in Breslau, a midwife was charged with procuring abortion. She was called in under suspicious circumstances, passed an instrument causing the "waters" to come away; two days later the fœtus was born. The midwife asserted that she merely drew off the urine by means of a catheter, while the patient said that she passed the instrument into the vagina and uterus in the same direction as the examining finger.

The experts examined were of opinion that the patient could not be sure whether the instrument had been passed into the urethra or vagina, particularly if she had never been catheterised before.

The author, after quoting numerous authorities, sums up the results of his own investigations as follows:—

1. The sense of localisation is very defectively developed in the female urino-genital system; the local differentiation between the urethra, bladder, and the vagina is quite uncertain; and a similar sense of locality between the vagina, portio, and uterine cavity does not exist at all.

2. The sense of touch, especially of the portions of this region which lie above their respective entrances, is likewise defectively grown. All judgment is absent as to the length of an object introduced; the thickness is fairly well recognised, but no correct estimate of it is made with certainty. There is great obscurity as to the form and other characters of objects introduced. The number of objects introduced into the

vagina is often falsely given. There is no sense of touch in the portio vaginalis and the uterus.

3. The sense of pressure is somewhat well developed in the urethra, in the vagina it is very feeble, and in the uterus and outer surface of the portio it cannot be demonstrated.

4. The sense of temperature is also fairly good in the urethra. In the vagina it is feebly developed, specially towards the hotter degrees of temperature. It fails entirely in the uterus and portio.

5. Sensation of pain is quick in the urethra, in the vagina; in the portio and cervical canal it is only moderate, in the uterine cavity it is often marked. This forms the only subjective difference between the uterus and vagina.

6. Vaginal douches and the customary disinfectives diminish the sensibility of the vagina.—Calmann, *Arch. f. Gynäk.*, Berlin, Bd. lv. Heft 2.

THERAPEUTICS.

UNDER THE CHARGE OF

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SODIUM BICARBONATE IN DIABETIC COMA.

R. LEPINE has recorded two cases of imminent diabetic coma, in which the attack was prevented by the intravenous injection of a solution of sodium bicarbonate (*Lyon méd.*, 1899). In the one case 300 grs. were administered with success. In the other the patient was very feeble, and was passing about 5 quarts urine daily, containing about 375 grs. urea, and between 4000 and 5000 grs. sugar. The urine gave a deep red coloration on the addition of iron perchloride solution, and in view of this he was subjected to pronounced alkaline treatment—900 grs. sodium citrate and 180 grs. sodium bicarbonate daily, with a large amount of leguminous vegetables. As he was threatened with coma, two quarts of sterilised water, containing 300 grs. sodium bicarbonate, were injected into a vein. Six quarts of urine were passed in the next twenty-four hours, and the general condition improved greatly; the sugar increased in amount, but remained acid. The first effect seems to have been a great increase in the elimination of salts, of β-oxybutyric acid, and of acetone.

Hertzog (*Berl. klin. Wchnschr.*, 1899, No. 14) advises that the solution may be given subcutaneously and frequently repeated, while large doses—150 to 600 grs. sodium bicarbonate—should be given by the mouth at the same time. The indications for the treatment are strong iron perchloride reaction of the urine, and increased excretion of ammonia and oxybutyric acid. If too much alkali be given, diarrhœa, palpitation, and hæmaturia may be induced.

CHLOROFORM NARCOSIS IN CHILDREN.

CASTUEIL states that chloroform narcosis in children deserves special attention, as the child is affected by the drug somewhat differently from the adult (*Wien. med. Bl.*, 1899, S. 273), being more susceptible to its action, but suffering less from unpleasant consequences. He has given chloroform to children 612 times since 1894. The previous evening the child is given a bath, a mild purgative and light diet, and in the morning an enema. Before administration the heart and lungs are examined, and any loose teeth removed, in case the mouth-gag may have to be used, with consequent risk of dislodging such teeth into the air-passages. A flannel night-gown only is worn, and if the tonsils are enlarged great care is taken to admit plenty of air along with the chloroform, which is given by means of a folded towel. Vaselin, glycerin, and olive-oil fail to protect the skin satisfactorily, the best plan being to pour the chloroform on the upper part of the folded towel; it does not come in contact with the skin, except as vapour. The usual restoratives should always be at hand in case of accident. Castueil does not approve of previous administration of morphine or atropine. As soon as the child feels the chloroform it holds its breath, sometimes to cyanosis, then makes a short inspiration and a long expiration. Children of 2 to 5 years of age go over in two to five minutes, older children require a longer time. As a rule there is no excitement stage, as in adults. If the lower jaw is gently pressed forward, it keeps the tongue away from the laryngeal opening. The corneal reflex disappears before there is full anæsthesia. Vomiting occurs in most cases. Weakly children are very apt to cease breathing without warning. The after-vomiting is common but less frequent than with adults. It is not controlled by painting the throat with cocain solution. Complete awakening occurs in one quarter to one hour after the operation, and milk, soup, or iced champagne should alone be given about eight hours later. The breath often smells of chloroform for twenty-four hours.

THEORY OF THE ACTION OF ALCOHOL AND ALLIED BODIES.

HANS MEYER (*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1899, Bd. xlii. S. 109) regards the narcotic action of alcohol, chloroform, ether, aldehydes, and similar bodies as being due to the power which they possess of dissolving lecithin, cholesterin, and fatty bodies generally out of the nerve cells. As these are important components of the nerve cells, and necessary for their proper function, it is on the nerve cells that the action is exerted early and strongly. The relative strength of these narcotising bodies is due to their relative powers of extracting fat. According to the amount of fat dissolved out of the brain cells, they are more or less depressed in function. Meyer points out that his view is not quite novel, as in 1847 Bibra and Harless found that after ether narcosis the brain is poor in fat, and concluded that it was removed by the ether circulating in the blood. In 1866 Hermann came to the conclusion that the alcoholic bodies dissolved out lecithin, cholesterin, etc., from the nerve cells and red blood corpuscles, and that this was the basis of their action. These researches and theories have, however, never attracted atttention.

IODINE IN THE BODY AFTER GIVING POTASSIUM IODIDE.

LEVENE has investigated the power of the tissues to combine with and retain iodine (*Am. Journ. Physiol.*, Boston, March 1899). He gave potassium iodide to hens and examined the eggs as they were laid. During the first three weeks these contained only sodium and potassium iodides, but thereafter iodine was also found in combination with fat. When the hens were killed, organic iodine compounds were found only in the marrow-fat, and were absent from nervous tissue, muscles, skin, intestine, fat, etc. Only certain keratins such as that of the hair, only certain proteids such as that of the thyroid gland, and only certain fats, have the power to bind and retain iodine in the body.

COPAIBA IN DIABETES.

BETTMAN has observed that in a case of diabetes the administration of copaiba (for gonorrhœa) very greatly increased the excretion of sugar (*Berl. klin. Wchnschr.*, 1899, S. 479), doubling or trebling the usual amount. This result was confirmed on another diabetic patient. On consulting the literature, he found that turpentine has the same effect, and in healthy persons may cause the appearance of small quantities of sugar in the urine. When grape-sugar was given along with copaiba to healthy men, a certain quantity of it always appeared in the urine. Camphor also causes glycosuria, in animals at least. No explanation is forthcoming of this action of essential oils and allied bodies.

SULPHATE OF SPARTEIN IN HEART DISEASE.

DR. P. M. CHAPMAN (*Birmingham Med. Rev.*, May 1899) states that he has been in the habit for many years of using spartein sulphate in cases of passive dilatation of the heart, especially without marked valvular lesion. He reports a case in which there was very advanced dropsy, a feeble pulse of 130 per minute, a markedly dilated right ventricle, and advanced atheroma of the arteries. Digitalis had been given without effect, and the patient was apparently dying. He prescribed ½ gr. spartein sulphate with 20 minims tinct. ferri perchlor., every four hours. There was almost immediate improvement, and in two days the patient was able to sit up.

It is often necessary to permanently continue the drug, but no increase of dose is necessary. One patient of Chapman's has taken it continuously for nearly a year, to relieve the dyspnœa consequent on an aortic lesion. The dose is ½ to 1 gr. every four hours. It has a slight purgative effect, and is also a diuretic.

ON THE CAUSE OF TOLERANCE TO ARSENIC.

BESREDKA has studied the behaviour of the leucocytes during the administration of small and large doses of an insoluble and a soluble compound of arsenic (*Ann. de l'Inst. Pasteur*, Paris, 1899, tome xiii. pp. 49 and 209). Guinea-pigs were used for the purpose of the observations, and the arsenical compounds were injected into the peritoneal cavity. A trisulphide of arsenic was chosen as the type of the insoluble compounds. When a large non-lethal dose is given, the leucocytes in the peritoneal fluid diminish greatly in number, the larger the dose the greater being the diminution. This lasts for ten or twelve hours, and is succeeded by great hyperleucocytosis. The animal is ill and out of sorts during this time, but in two or three days the blood becomes normal again, and vivacity and appetite are recovered. In the peritoneal exudation the phagocytic leucocytes take up the arsenic in small granules, the lymphocytes do not do so. During the diminution it is the former which disappear, while the latter persist. If the animal is going to survive, the great increase of phagocytes goes on for a longer or shorter time according to the dose, whereas, if it is going to succumb, the leucocytes in the peritoneal exudation become very few. In the former case the process may extend to ten or twelve days. Besredka states that this is exactly similar to what is seen when toxins are administered. He explains the appearances thus. If the quantity of arsenic trisulphide in the peritoneum is so large that the leucocytes cannot habituate themselves to it, they disappear from its neighbourhood, and thus save themselves, but the guinea-pig dies of arsenical poisoning, as the sulphide slowly dissolves in the body fluids and acts on the tissues. When a smaller dose is given, the initial hypoleucocytosis soon gives place to hyperleucocytosis, and the arsenic is absorbed by the leucocytes and carried off. After ten or twelve days it can no longer be seen in them, and probably has formed a new, soluble, and less toxic compound.

Almost no elimination of arsenic takes place during the first few days, the elimination only beginning at the decline of phagocytosis and going on very slowly and chiefly through the kidneys. Arsenic is found in the liver and spleen, but not in the alimentary canal. When a soluble compound, such as arsenite of sodium, is given, there is always at first a stage of hypoleucocytosis, which may persist till death, or be followed by hyperleucocytosis. The explanation is the same as before. According to this view, tolerance of large doses of arsenic is due to the fact that the leucocytes gradually become accustomed to it, and can deal with and render innocuous much larger quantities than can the leucocytes in an animal unaccustomed to take arsenic.

DIURETIC ACTION OF ABDOMINAL MASSAGE.

CANTRU (*Gaz. d. hôp.*, Paris, 1898) finds that massage of the abdomen has a marked diuretic action, either employed alone or in combination with general massage. In cardiac dropsy the excretion of urine rapidly rises, generally about the third day; the heart's action becomes more regular, the general condition improves, and the composition of the urine becomes more normal. It can be employed along with ordinary treatment, and often is of great assistance to it.

TREATMENT OF TUBERCULOSIS BY DRUGS.

AT the recent Berlin Congress Kobert gave an address on this subject. He sets out with the dictum that there are no specifics, and that in the miliary and so-called "galloping" forms all treatment is in vain. Nevertheless, drugs have a great value in other cases. In surgical cases he especially emphasises the curative effect of iodoform; in all cases good feeding and fats increase the resisting power of the patient, narcotics are of value in allaying cough, the ethereal oils in cases where the expectoration is fœtid, and orthoform and lactic acid locally in laryngeal cases. Antipyretics are undoubtedly indicated in cases where rest in bed does not lower the temperature. Camphor and cinnamic acid probably exert their favourable action by inducing a curative leucocytosis.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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The Complications of Gonorrhœa.

Among the more common diseases, few show more marked variations in their behaviour than does gonorrhœa. For a long time it seemed to be impossible to harmonise the apparently contradictory observations which from time to time appeared, but our evidence is now so complete that we can bring most of these into line. Bumm's original observation, that the gonococcus was able to grow and flourish only in mucous surfaces, has now been abundantly refuted, and we are thus able more clearly to understand the many complications which may appear in the course of this disease. We may resolve its many manifestations into two divisions, namely, the local and the general. In the first, we are still in doubt how far up the genito-urinary tract the gonococcus may spread. In the male there is often a considerable degree of inflammation in the prostate and vesiculæ seminales in acute cases. Cystitis and orchitis also occur in early stages. We do not yet know, however, whether these are due to the actual invasion of the parts by the gonococcus itself, or by some accompanying organism. Such accompanying organisms are common enough in the more chronic stages of the disease, and undoubtedly aid in keeping up the local irritation, as well as in producing many of the secondary results. In this relation, evidence in favour of the culpability of the gonococcus is gradully accumulating. The writer has found the gonococcus present alone in the pus of a prostatic abscess, which occurred in the later and more chronic stages of an acute gonorrhœa, but it is in the early acute stages that evidence is likely to be of most value. A paper by Berg (*Med. Rec.*, N. Y., 29th April 1899, p. 602) contains particulars of a case which appears to be of importance in this relationship. A male, æt. 21, suffered from a chill, with fever and swelling of the metatarso-phalangeal joint of the left thumb, nine days after the onset of a gonorrhœa. Again, seven days later, he complained of pain in the region of the left kidney, and palpation elicited great tenderness posteriorly. At the same time pus cells and granular casts appeared in the urine. There was a high temperature at intervals. He had several convulsions, and after a further interval of twelve days a loud systolic bruit was heard at the apex of the heart, and a rough blowing systolic bruit over the base, with absence of the second sound. He died suddenly next day, twenty-six days after the onset of the gonorrhœa. The post-mortem showed an acute pyelonephritis of the left kidney; and bacteria having the microscopic characters and staining reactions of the gonococcus were found in the fluid in the pelvis of this kidney. The bladder and left ureter were apparently normal, as the record says nothing about them. There were large vegetations and ulcerations on two of the aortic cusps, one of which was perforated; and two small yellowish nodules upon the segments of the mitral valve. Similar bacteria, apparently gonococci, were found in the vegetations. Cultures were not obtained, however, and the evidence is therefore not unrefutable, for we must carefully remember that there are other species of diplococci, some of which have been cultivated from both the normal and diseased urethra, which resemble the gonococcus, not only in microscopical characters, but in staining reactions. A gonorrhœal endocarditis has not yet been absolutely proved by means of cultures, although in one case Thayer and Blumer obtained a pure culture from the blood during life. Two attempts to obtain such a culture in Berg's case failed. If his case is a true example of gonorrhœal pyelonephritis and endocarditis, it seems likely that the former was due to direct local extension, while the latter was certainly due to blood infection. The unilateral distribution of this pyelonephritis is a strong argument in favour of its being a local infection, and if so, it is the first instance of such an extensive spread in the male. There is plenty of evidence of extensive local infection in the female; and suppurations in connection with Bartholin's glands, and forms of endometritis, salpingitis, and abscesses in the Fallopian tubes and ovaries, have all been proved to be due to the gonococcus. Wertheim's experiments further proved that intraperitoneal injections of pure cultures in white mice produce a localised peritonitis with a small amount of suppuration, and cases of a similar localised gonorrhœal peritonitis in the region of the tubes and ovaries in the human subject have been described. It has, however, been denied that a diffuse general gonorrhœal peritonitis can occur, owing to the antagonism which the endothelial cells lining the peritoneum present to the spread of the organism; cases such as those of Bland Sutton (*Brit. Med. Journ.*, London, 1896, vol. ii. p. 1309) being generally regarded as due to a mixed infection, and not purely gonococcal. It is doubtful, however, if this can any longer be maintained in the light of the two cases recorded by Cushing (*Johns Hopkins Hosp. Bull.*, Baltimore, May 1899). The one was æt. 25, and the other 18. Both showed a diffuse involvement of the peritoneum, occurring during menstruation, and following a recent exposure to infection associated with the exacerbation of a pre-existing leucorrhœa. Probably the uterus and tubes are less able at such a time to resist invasion. The clinical history of each case was closely similar, and may be thus synopsised. The onset of the abdominal symptoms was sudden, with pain and vomiting, but without the shock and collapse seen in perforative peritonitis. There was no great abdominal tenderness, no distension from paralysis of the bowel, and nothing was gained by pelvic examination, as both patients concealed the nature and seat of the trouble. Both showed marked leucocytosis. The tubes were patent, and the peritonitis was of the dry and fibrinous kind, with a distinct individuality, as Brose has pointed out. There was no pus nor serous exudate. The peritonitis did not appear to be older nor more plentiful in the pelvis than elsewhere. The whole serosa was uniformly injected, and the deposit of fibrin was so thick in places, *e.g.* liver and spleen, that it could be peeled off. It was not very adhesive. Both cases recovered after the operation, and the author is of opinion that they would have done so equally well without operation, except that there would have been a subsequent chronic pyosalpinx, which would have necessitated operative interference later on. In both cases the gonococcus was the only organism found in the peritoneal exudate, and pure cultures were obtained therefrom. The tubes were examined in both cases, and though the sections did not show the gonococcus, there would seem to be no doubt that the peritonitis was the result of the direct extension of the organism by continuity of surface, from the cervix uteri upwards. In Case 1 there was an extensive degree of endosalpingitis with leucocytes and broken-down epithelial débris in lumen, and great congestion of the subepithelial tissue, which also contained many leucocytes with fragmented nuclei. In Case 2 there was less catarrh, but more advanced peritonitis. The author is of opinion that acute general peritonitis of gonococcal origin is rare. It may occur both in the puerperium and during menstruation, and may depend upon some specially receptive condition of the serosa or virulence of the organism. The latter is probably the chief factor, as the lochial or menstrual discharge must form a very suitable food material for its growth. From experiments we know that it is only when it reaches the peritoneum in large numbers that it attacks it, and further that the resulting inflammation tends quickly to subside. In the light of those two cases of Cushing's we may further say that, even where it does occur, it will often pass unrecognised, for there seems to be no doubt that, although we can no longer hold that the peritoneum as a whole is invulnerable to the attacks of the gonococcus in virulent conditions and plentiful numbers, yet it seems probable that when a general peritonitis is thus produced, it differs from other forms in rapidly subsiding and tending to spontaneous cure. Thus it will rarely demand operation in its acute stage. The discussion of the general infections of the gonococcus will not be entered into at the present time. Suffice it to say that few organisms show such a number of suppurative sequelæ as it does. Its occurrence in inflammations of the conjunctiva, iris, joints, bursæ, tendon sheaths, heart valves, veins, pericardium, and pleura, have all been demonstrated. Cases of pure septicæmia have recently been described (*Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, No. 25, Bd. xxiv. S. 955). The spread must in all these cases be by the blood.

DIAGNOSIS OF GONORRHŒA.

WATERHOUSE (*Practitioner*, London, March 1899) relies upon the presence of organisms in groups within the pus cells in suspicious urethral discharges. In acute cases a mistake is unlikely, but in chronic cases many organisms may be present outside the pus cells, which even decolorise with Gram's solution, and yet not be gonococci. He is quite right in his contention that doubt may often arise, and, unless due care be taken, a mistaken diagnosis be made. A few gonococci mixed with other organisms cannot be recognised with certainty by microscopic methods alone, and it is wise in some cases to withhold a definite opinion; but when present in considerable numbers within the leucocytes, whether they are also present outside or not, and when they conform to the typical staining reactions, a definite diagnosis may at once be given, and in the acute stage it may in this way be made earlier than by any other method.

The Cancer Parasite.

Curtis of Lille (*Presse méd.*, Paris, No. 20, 1899) has obtained entirely negative results in a series of experiments which he has carried out for over four years. He considers that tissues taken from superficial epithelium are not good, on account of their liability to contamination. Tissues from the breast and testicles are better. In eighteen such cases and a careful series of experiments, he failed to obtain any growth on any media or to produce contagion in other animals. He therefore concludes that positive results have been obtained only through imperfect technique.

Transmission in Typhoid Fever of the Agglutinative Power of the Blood to the Fœtus.

Mosse and Fränkel (*Gaz. d. hôp.*, Paris, January 13, 1899) record the case of a young woman who had typhoid fever in the sixth month of pregnancy. A healthy child was born at full term. Its blood showed a distinct agglutinative effect, less marked, however, than the blood and milk of the mother. Microscopic examination of the placenta showed it to be normal. The child was suckled before the test was made, and hence it is possible that the child's blood may have acquired its agglutinative power through the mother's milk. This transmission has been proved both in the human subject and in animals. Another case described by the same authors puts the direct placental transmission beyond doubt. A woman aborted on the fifth month of pregnancy, on the twelth day of convalescence from typhoid fever. The blood from the fœtal heart showed distinct agglutinative power, less marked than that of the maternal or placental blood or colostrum; on microscopic examination the placenta was found to be normal, and no typhoid bacilli could be found in it. The explanation of this fœtal agglutinative power is probably to be found in the passage of the agglutinative substances through the placenta, as the blood of the fœtus has been shown by Achard to be sterile. It is therefore improbable that the typhoid bacilli themselves pass through the placenta. This organ probably acts like a filter, allowing some of the agglutinative power of the maternal blood to pass into the fœtus, which retains it for a variable period after birth. Other observers have found the agglutinative power absent in the fœtal blood in similar circumstances, and this is probably to be explained partly by the varying intensity of this power, acquired by the maternal blood itself, and partly by the time during which the agglutinative substances act on the placenta. In two negative cases in the human subject, in which abortion occurred, this period appeared to have been about eight and twelve days respectively, whereas in the above mentioned cases it was forty-five and ninety days respectively.

THERMAL DEATH POINT OF TUBERCLE BACILLI IN MILK AND SOME OTHER FLUIDS.

THEOBALD SMITH (*Journ. Exper. Med.*, N. Y., No. 2, March 1899, vol. iv. p. 217) gives the results of a series of experiments with pure cultures of the tubercle bacillus and with caseous material, with a view to determine the highest temperature which the bacillus can resist with impunity. His results are as follows:—Tubercle bacilli suspended in distilled water, normal salt solution, bouillon, and milk, are destroyed at 60° C. in fifteen to twenty minutes. The majority are destroyed in five to ten minutes. When tubercle bacilli are suspended in milk, the pellicle which forms during the exposure at 60° C. may contain living bácteria after sixty minutes. This is explained by the fat globules carrying the bacteria into the pellicle which shields them from the heat. It is probable that the resistance of other pathogenic bacteria to heat are increased by milk in the same way.

INOCULATION OF AN ENTIRE COMMUNITY WITH HAFFKINE'S PLAGUE VACCINE.

IT is hoped that the Plague Commission, whose report is eagerly looked for, will throw much light on this subject. A somewhat strikingly favourable result has just been published by Bennet and Bannerman (*Indian Med. Gaz.*, Calcutta, June 1899, p. 192). Two separate plague epidemics attacked the district in which the 26th Regiment of Madras Infantry was stationed. In the first, towards the latter part of 1897, the regiment suffered severely. Inoculation with Haffkine's vaccine was made towards the end of the epidemic upon 1665 persons, out of a total of 1746 living in the lines at that date. Only two of the inoculated cases were attacked, and both recovered. The second epidemic occurred in the summer of the following year, and the regiment was at first allowed to mix freely with the inhabitants of the city and cantonments. Later, it was confined to its own lines. Only twelve cases occurred within the regiment, while the city and cantonments suffered severely. Of these twelve cases, three had not been inoculated, and they died; of the other nine who had been inoculated, six recovered. The authors attribute this excellent result to the protection afforded by Haffkine's vaccine, and are of his opinion, that in his prophylactic we have a means of controlling an epidemic of plague, and converting it into a manifestation of sporadic cases only.

THE FATE OF THE GIANT CELLS WHICH FORM IN THE ABSORPTION OF COAGULATED BLOOD SERUM.

HEKTOEN (*Journ. Exper. Med.*, Nov. 1898, No. 6, vol. iii. p. 573) has given the result of some experiments in which he inserted small pieces of sterile solidified blood serum into the anterior chambers of several healthy rabbits' eyes. Absorption took place slowly, and with well-marked anatomical changes. The animals were killed at intervals of from a few days to six or more weeks after the operation. He gives a careful account, excellently illustrated, of the various histological changes seen, of which the following is a brief summary. The giant cells formed in the absorption of coagulated blood serum subdivide into uninuclear small cells, that take part with other new formed cells, derived from the lining of the anterior chamber, to form a densely fibrillated mass of tissue, that resembles the cornea in its structure. He is of opinion that this strengthens his previous contention (*Journ. Exper. Med.*, Baltimore, 1898, vol. iii. p. 21), that the giant cells in healing non-degenerated tuberculous tissue may separate into small living cells, and that the giant cells of tuberculosis are not necrobiotic elements, as has been the general teaching, especially in Germany.

PHYSIOLOGY.

UNDER THE CHARGE OF

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Intracellular Secretions.

In an exceedingly interesting paper by Krause (*Arch. f. mikr. Anat.*, Bonn, Bd. xlix. S. 707–769) on the salivary glands of the hedgehog, the subject of the nature of Giannuzzi's crescents has been fully discussed. Three views have been held as to their nature. The first one is usually associated with the name of R. Heidenhain, who held that these cells were the developmental forerunners of the mucin-forming cells; the second one, ardently supported by Stöhr, is that they are simply the mucin-forming cells in a different phase of functional activity; while the third and far the most probable view is, that the two types of cells are absolutely distinct, those of the crescents secreting albuminous substances (serous cells), and not mucin as the others do. The proofs in support of the last view are as follows:—(1) Between the cells and the crescents, and possibly also within the cells themselves, there are fine canals which act as channels for the passage of the serous secretion. (2) Pigments injected into the blood stream of the living animal are found to be deposited in the crescent cells and not in the mucin-forming ones. (3) The secretion found in the lumen of the ducts is similar to that occurring in the intercellular capillaries and also to the granules found in the cytoplasm of the crescent cells. (4) The amount of albumin in the saliva depends partly on the number of these crescent cells. Thus, in animals with few crescents of Giannuzzi, or with small cells in these zones, there is but little albumin secreted; while in others, where they are well represented, the opposite condition exists.

Although Krause holds that it is proved, it is still doubtful whether the intercellular canals give off lateral branches, which pass into the cells. Recently a large amount of work has been done on the relationship between histological structure and physiological function of cells, especially with regard to secretory products. Attention has been directed to the nature and source of granules in such cells as those of the pancreatic acini (Galeotti), the oxyntic cells of the newt's stomach (Carlier), and the leucocytes (Ehrlich, "Die Anaemie," 1898), in order to arrive at some definite conclusions as to how physiological activity of a cell may alter the characters of its constituents. This has been especially worked out from the standpoint of alterations in the reaction of granules towards acid or basic dyes, and also as to the relationship of these granules to the condition of the nucleus. We know that the nucleus is the directing agent in the cell life, and that there must be interchange between its constituents and those of the cytoplasm, only it is difficult to differentiate between alterations due to bodies passing inwards and those passing outwards. Micro-chemical reactions have been employed by Macallum, to find out whether the cytoplasm or nucleus contained organically bound phosphorus; but, unfortunately, the methods are still too crude to admit of exact intracellular analysis, as it is practically impossible to distinguish between a substance containing phosphorus in organic combination and one which merely contains firmly bound inorganic phosphates. We can only say that in certain parts of the cell, *e.g.* the nucleus and the granules, the reaction for firmly bound phosphorus is a distinct one, while in others it is absent.

We can only arrive at a definite knowledge of the nature of intracellular metabolic processes by combining the purely histological with the micro-chemical, and also by a careful study of the effect of certain cell changes on the general metabolism. And by histological examination one must include not merely the examination of the cell in one stage of functional activity, but after it has been affected by experimental (physiological) or pathological conditions, and also the alterations which it undergoes in the developmental life. In a paper read by Carlier at the Physiological Section of the British Medical Association, 1898, and at present being published in *La Cellule*, Paris (August 1899), the changes which the oxyntic cells in the newt's stomach undergo during digestion are fully discussed. The cells were examined at different stages of digestion. He showed that the stages of exhaustion and recuperation were marked by distinct alterations both in the cytoplasm and the nucleus. Secretion begins in the œsophagus soon after food has been taken, and then it gradually sweeps through the whole organ, usually affecting the pyloric glands about one and a half hours after the commencement of the process. One may say roughly that the cell undergoes exhaustion, as shown by loss in chromatic substance, in about four hours, the chromatin, which disappears, going to form granules of prozymogen (intranuclear), and subsequently passing into the cytoplasm to form the zymogen. It seems not unlikely that in the transformation of prozymogen into zymogen there is a linking on of albumin, rendering the compound more acidophil, while the zymogen is converted into the active enzyme ("the zymin") by means of such a hydrolytic agent as a weak acid. The nucleoli appear to be effete products derived from nuclear degeneration. They are certainly extruded from the nuclei, and their later destiny is unknown. If it be difficult to interpret what occurs during exhaustion, it is almost impossible to understand the nature of the changes occurring during repair of the chromatin. It seems most likely that, in part at least, the nucleins are synthetically formed in the nucleus. After the chromatin of the nucleus has returned to its normal condition, then, when the cells are again stimulated by food, they pass through the different stages of exhaustion described by Carlier. It is interesting to note that mitotically dividing oxyntic cells also secrete zymogen.

FORMATION AND DECOMPOSITION OF URIC ACID.

HUGO WIENER (*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, Heft 5 and 6, Bd. xlii. S. 375) has recently made a very valuable contribution to the subject of uric acid formation and destruction in the animal body. His principal results may be shortly summed up as follows:—(1) In the liver of the dog and pig, uric acid is partly destroyed, while in that of the ox it is formed. (2) In the kidney and muscles of the ox and horse, uric acid undergoes destruction, while it is unaltered (neither formed nor destroyed) in the same tissues of the dog. (3) The blood of the ox and horse does not break down uric acid, neither does dead or boiled kidney substance. Chloroform, however, does not hinder the decomposing action of the kidney in these animals. (4) With the loss in uric acid, under the above condition, there is an increase in glycocoll, though not so much as one would expect, if from one molecule of uric acid one molecule of glycocoll were produced. Thus—

$$C_5H_4N_4O_3 + 5H_2O = 3NH_3 + 3CO_2 + CH_2.NH_2.COOH.$$

(5) As in the liver, so also in the spleen and thymus of ox, there is an increase in the formation of uric acid, but never so marked as in the case of the first organ. This is a very important point, as it goes to disprove the theory of the origin of uric acid from the nuclein of leucocytes. The author therefore does not agree with Horbaczewski, in his well-known views on the direct connection between the number of leucocytes in the circulating blood, and the excretion of uric acid and the alloxuric bases. The author also refers to the following important action. If an alcoholic extract of the liver of the ox be taken, the alcohol removed by evaporation, and the residue extracted with water, the aqueous solution has the power, on being added to fresh liver substance, of markedly increasing the amount of uric acid formed. The author wisely emphasises the fact that there were no xanthin bodies in the alcoholic extract, which might have been oxidised to uric acid, had they been present. Hypoxanthin seems to increase the amount of uric acid on being added to the liver. The ammonium salt of sarcolactic acid and glycocoll, added together to the liver substance, did not affect the amount of uric acid formed. Seeing that there are such marked differences between the organs in different animals, with regard to their action on uric acid, it is difficult to draw deductions from the author's papers as to the seats of its formation and destruction in the human body. There seems, however, to be little doubt that a disturbance in the nitrogen metabolism, leading to an increased production of uric acid

at the expense of urea, cannot be directly associated with leucocytosis, as so many German writers believe. It by no means follows that a simple increase in the number of leucocytes must result in an increased formation and excretion of uric acid, merely because there is an intimate connection between the nuclein of the leucocyte nuclei and uric acid, with the alloxur bases as binding links. The theory that the kidneys are the seats of formation of uric acid is almost entirely based upon the assumption that uric acid, under normal conditions, does not occur in the blood. There is good evidence for believing that there is always a small amount of uric acid in the normal blood, quite large enough to account for the small secretion of uric acid in the urine. We know almost nothing of the nature of the changes in metabolism which lead to an increase or decrease in the uric acid excretion in man. There can be no doubt that even in that condition, when the uric acid formation and excretion are supposed to be markedly increased, namely, leucocythæmia, there may, in some cases, be hardly any disturbance in the nitrogen metabolism.

DISEASES OF THE EYE.

UNDER THE CHARGE OF

GEORGE A. BERRY, M.B., F.R.C.S.Ed.,

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AND

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Racial Distribution of Trachoma.

In regard to the liability of various races to granular conjunctivitis, Yarr divides the various peoples of the world into three groups, these containing respectively those who are receptive, relatively immune, and positively immune. At the head of the first of these classes he places the Chinese and Japanese; according to various observers, trachoma accounts for as much as 78 per cent. of all eye disease in certain districts of China, and about 75 per cent. in Japan. In the same group, though they are less susceptible than the nations just mentioned, he places the natives of Egypt, Persia, and India, and among white races the Jews, Poles, Italians, and Irish. In the second or relatively immune class are to be placed the pure-blooded negroes; Van Millingen of Constantinople denies this supposed immunity of the negro, on the ground that he has seen a considerable number of cases of trachoma among the blacks in Turkey; but Yarr points out that the Turkish negro is by no means of pure blood, but the inhabitants of North Africa, from which place most of the Turkish negroes of course come, are very largely mixed with Semitic blood, and this carries with it a very decided proclivity to trachoma. It is interesting to note that in Cuba, where the population consists of three races, namely, whites, negroes (somewhat impure), and Chinese, the comparative immunity of the negro can be distinctly shown; for, taking the *relative* frequency of trachoma among the three races, for one negro attacked there are affected four whites and seven Chinese. In the group of those absolutely immune are to be placed the Indians and Esquimaux of Canada, according to almost all the ophthalmic surgeons of note in the Dominion. This is all the more noteworthy, because in many instances these people live under the most dreadfully unwholesome conditions, huddled together without any reference to considerations of health, unclean to a fearful degree, many of them tuberculous, many more syphilitic, liable to severe epidemics, and exposed to every disease under the sun, but never is trachoma to be seen among them. It appears, however, that the Indians of the United States belong to a somewhat different race, and are by no means free from the disease. These and similar facts help to confirm the opinion that trachoma is not merely a question of dirt and overcrowding, as some have maintained; nor is it, as others have attempted to prove, a disease dependent on climate alone, for in whatever land he dwells (and where is he not?), the Jew, the Chinaman, or the Irishman is distinctly more liable to trachoma than is the native of the country. Abundant proof of this can be obtained in the United States, where one may see negroes and Chinamen living side by side under the same atmospheric and not dissimilar social conditions, yet the one is free, while the other is very frequently affected. Chibret's view, that high altitudes afford protection, is true only to a limited degree; given other suitable conditions, a high altitude alone is not sufficient to protect. Thus in the Alps, where at great heights the air is both cool and moist, there is almost no trachoma, but among the mountains of such a country as Persia, where the air, even at high altitudes, is very hot and dust-laden, trachoma is frequent. Yarr regards filth, overcrowding, and starvation as factors increasing racial receptivity, probably chiefly by lowering the resisting power, but not as in themselves sufficient to make the disease common, unless where there is also this peculiar racial liability.—*Brit. Med. Journ.*, London, May 1899.

Dacryo-Cystitis in Infants.

According to Cosmettatos, who has devoted much attention to the question, the lachrymal canal takes its rise in the fœtus from the sac, and at first forms a solid fibrous cord, which afterwards becomes hollowed out into a canal. Dacryo-cystitis is a disease not extremely rare in infants even of a few days only; and this is not difficult to understand, since, if we suppose that the cord has not become pervious throughout its whole length before birth, its contents will very readily accumulate and become septic. This dacryo-cystitis may appear so early as the third day after birth, in which case it may very easily be mistaken for a purulent conjunctivitis, but the child is more usually a few weeks old when the inflammation occurs, so that to describe it as congenital, which is sometimes done, is not quite accurate. As regards treatment, Jocqs disapproves of probing, and finds that vigorous injection of an aseptic or mildly antiseptic solution is preferable, his idea being that the absorption of that portion of the cord which still remains imperforate is thereby hastened. When acute inflammation is actually present, the fluid he employs is protargol, which has always given him good results. —*Clin. opht.*, Paris, May 1899.

EXTIRPATION OF THE LACHRYMAL SAC.

In a certain very considerable proportion of cases of chronic catarrh and inflammation of the lachrymal sac, the difficulty of obtaining any results at all satisfactory is such, that in very obstinate cases the only really effective treatment seems to be the entire removal of the sac. Obliteration of the sac by the cautery is not at all a good method of attaining the effect aimed at, as it is both uncertain and disfiguring. Removal of the sac by dissection is far more to be commended; its performance, however, requires very considerable care, as harm rather than good will be done if any fragments of tissue are left, and the very free hæmorrhage which always occurs causes some difficulty; for details of the different modes of operating favoured by the writers at present referred to, the original papers must be consulted. The indications for operation are principally the failure of conservative treatment to relieve the annoyance, or the patient's inability or unwillingness to undergo treatment which must necessarily be so prolonged and painful, or the existence of an impermeable stricture which precludes any idea of probing. Some consider it to be indicated also when immediate operation upon the globe is called for in a patient suffering from chronic sac disease, or where a hypopyon keratitis is present. One would be apt to suppose that the removal of the sac would simply intensify the epiphora, which is always an annoying symptom, but such is not the case; apparently the removal of this source of irritation causes diminution of the (reflex?) supply of tears, and the patient is relieved from the troublesome watering which formerly was a cause of grave discomfort; but it is fair to say that one of the authors regards the procedure as incomplete if the lachrymal gland is not at the same time excised.—Aronis (Smyrna), *Ann. d'ocul.*, Paris, March 1899; Holmes (Cincinnati), *Arch. Ophth.*, N. Y., Jan. 1899; Lawford, *St. Thomas's Hosp. Rep.*, London, vol. xxvi.

STYLES OF PROTARGOL.

IN Antonelli's experience, protargol has proved so valuable in lachrymal affections that he is desirous of extending its usefulness, and recommends the use of bougies containing that preparation. One of its good qualities is its being more diffusible than nitrate of silver, though this demands that the drug shall remain longer in contact with the affected tissues. To attain this end, he has had styles or bougies made, each about 3 cms. in length, and in calibre the thickness of a No. 3 or 4 Bowman's probe; the basis employed was gelatin, but they contained about 50 per cent. of protargol; with these he has obtained good results in chronic dacryo-cystitis, even where bare bone had been felt. Some dexterity is required to introduce the bougie without breaking.—*Rec. d'ophth.*, Paris, April 1899.

CHESTNUT THORN INJURIES.

IN certain districts of France chestnut growing is a great industry, and in autumn, when the harvest is gathered, injuries to the eye, presenting certain peculiarities, are far from uncommon. On the outside of the ripe fruit are numerous extremely fine spines or thorns, no thicker than a hair, and yet very sharp. The fruit is knocked from the tree by a person standing under the branches and wielding a long pole, and it is easy to suppose that a chestnut may tumble through the foliage and strike the open eye of the peasant. The little prickles do practically no direct harm to vision, they are so extremely minute, but they cause the most intense photophobia, pain, and lachrymation, while their removal is exceedingly difficult, as forceps can hardly be made to grasp an object so fine. The ordinary "harvest ulcer" of the field-worker is but rarely seen in persons whose eyes have been previously sound as regards the tear passages, whereas in the chestnut injury a septic ulceration of the cornea is quite frequent, even in patients whose lachrymal apparatus is in perfectly good order. Deschamps of Grenoble therefore considers that in the latter case the septic infection must be primary and direct, not secondary to a previous lesion as in the former case. The little prickles, though they are so fine and so brittle, are yet so sharp that sometimes one or several will penetrate deeply into the cornea before breaking off, and may even open into the anterior chamber, and on their removal the aqueous humour will drain away slowly through the minute channel remaining; that this is by no means an unmixed evil, has been proved again and again to Deschamps' satisfaction, because in an eye injured thus by several prickles, some of which perforated and others not, he has observed the non-perforating wounds to become septic, while those which led into the anterior chamber did not. He attributes this to the cleansing and antiseptic action of the aqueous humour; and so confident is he of this, that in a number of these cases he believes the best treatment to be the passage of a fine tattooing needle along the track of a non-perforating puncture into the anterior chamber, so as to convert it into a fistula, along which the aqueous humour may slowly filter; sepsis is thus prevented.—*Ann. d'ocul.*, Paris, April 1899.

MULTIPLE IMAGES IN THE NORMAL EYE.

IT is a fairly familiar fact that if an eye be not correctly focussed for a luminous point, such point may appear to the observer multiplied, and the same symptom may be present in disease or malformation of the eye. Shelford Bidwell finds that under favourable conditions a normal eye can see hundreds of images of a single point, an effect which probably results from the cellular structure of the lenses and membranes. Employing as the luminous object the horse-shoe shaped filament of an electric lamp, this was placed at a distance of a few feet, and looked at through a convex lens of 5 in. focus, through a slit $\frac{1}{80}$ in. wide, when a great number of minute, closely placed images of the filament were visible. By five different observers the number visible under such conditions was found to vary from twenty to thirty; they were not all equally bright, and the number in a row was reduced by contraction of the pupil.

Increase of the distance at which the luminous point was held, or of the power of the convex lens, caused the images to lose distinctness at a distance of 20 feet; with a lens of 3-in. focus the separate images appeared to coalesce, but the band of light was crossed by a number of hazy dark lines, at fairly equal distances apart. This led the author to think that the original images had been resolved into still simpler elements, and he calculated that each of the original images was divided by the dark lines mentioned into about twenty-five, which would give a total of four to five hundred. Taking the diameter of a feebly illuminated pupil to be about $\frac{1}{5}$ in., these observations seem to indicate some fairly regular anatomical structure in or near the crystalline lens, and composed of cells measuring $\frac{1}{2500}$ in. in diameter. It has been suggested that the endothelium on the anterior surface of the lens may be the structure responsible for these phenomena.—*Proc. Roy. Soc. London*, Feb. 1899.

TETANY AND CATARACT.

THE theory which attributes non-senile cataract to a primary shrinkage of the nucleus, with subsequent secondary changes in the fluid thus expressed, has much to recommend it. In this connection it is interesting to note a certain relationship between tetany and cataract, which has occasionally been observed, and of which Wettendorfer of Graz records two recent instances. Both patients were women who had for several years been liable to severe periodic cramps, during the course of which vision for distance was always obscured; by and by the lenses became opaque. As both patients were young, and there was no evidence of any other pathological condition which could have led to the formation of cataract, perhaps Wettendorfer is justified in considering that the frequent and violent spasm of the ciliary muscle had brought about this change in the constitution of the lens.—*Beitr. z. Augenh.*, Hamburg u. Leipzig, 1899, Bd. xxxviii.

ANALYTICAL REPORTS.

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INFANTS' FOODS.

The best of all infants' foods is of course mother's milk. That goes without saying. But mothers are often unwilling or unable to nurse their offspring; their milk is frequently of too poor a quality or too scanty in amount to properly nourish the infants, or from some cause or other fails to agree and to be easily assimilated. What form should the substitutes for the natural food take, to afford the infant the best chances of maintaining healthy growth, averting disease, and providing for an unimpaired constitution, as far as possible throughout after life? Foster-mothers seem to have fallen in favour later, although rationally the best substitute for a mother who fails to do her duty by her children. Perhaps this is with some reason, for modern theories of disease and its transmission, and the by no means improbable idea that the child draws in with the milk some of the mysterious factors which go to make up personal character and temperament.

Then comes cow's milk, treated so as to render it as near akin to human milk as possible, by dilution with water or with bland watery solutions, and by the addition of sugar, unfortunately as a rule of a kind which is absent from the natural fluid, and which frequently proves a source of discomfort to the infant. The widespread, though comparatively recent, fear of the dangers which may lurk in cow's milk, the apprehension of infection arising from its use, have been sufficient to introduce the practice of boiling or sterilising it before use, and to call forth a number of preparations in which cow's milk can be obtained already sterilised, treated to conform with the human milk in composition ("humanised"), or dried and powdered for subsequent solution in water. In addition to these, a number of preparations have been placed on the market, in which part of the food-substances in milk have been previously altered in greater or less degree by the action of digestive ferments, while others are so compounded that they afford a much more concentrated article of food than milk does, but still with the food-elements in due relationship.

The preparations intended to represent natural human milk, in form and substance, may be used under normal circumstances where the mother cannot or will not nurse; when these are inefficient, or the mother's milk does not suffice or disagrees, the aid rendered by use of the more highly concentrated and prepared foods is often invaluable.

Nature provides us with an example of what the food of infants ought to consist, both in amount and in character. For infants in health, all substitutes should conform to her standard; in presence of disease or of normal conditions, her standard may be altered according to circumstances.

Other factors which should be kept in mind, in connection with infants' foods, concern the capacity of the stomach during the earlier stages of life, and the inability of infants under two months to make a proper use of starchy bodies. Probably an administration of food in too great bulk, although its total components be correct in amount and proportion, apart from dilution, is more productive of evil results than a provision of the same totals in more concentrated form than is nature's standard, but given in smaller amounts at each time. Again, even after the lapse of the second month, it ought to be remembered that infants are not properly equipped with a gastric and intestinal organisation for dealing with carbohydrates, which require modification before utilisation by the body, and are especially incommoded by the presence of such of them as are readily fermescible.

The stomach of the human infant may be said to have a capacity according to the age of the child of—

	New-Born.	One Month.	Two Months.	Six Months.	Nine Months.	One Year.
STOMACH—						
C.c. . . .	50	106	150	190	240	400
Oz. . . .	1·75	3·5	5·25	6·8	8·5	14
HUMAN MILK contains in these amounts (in grains)—						
Proteids . .	18·12	36·24	54·36	72·48	90·6	145
Fats . . .	32·17	64·32	96·5	128·6	160·85	257·3
Sugar . . .	46·7	93·4	140·1	186·8	233·5	373·8
Ash . . .	2·0	4·0	6·0	8·0	10·0	16·1

Stating it roughly, the daily food of a young infant during the first few weeks of life should be able to afford about 50 grs. of proteids, 90 grs. of fat (much of which is not absorbed), and 140 grs. of sugar; and similarly at six months, 420 grs., 750 grs., and 1030 grs. respectively; if the food taken be entirely mother's milk, the quantities required to yield these amounts at six months would necessitate more than five meals in the day, owing to the normal capacity of the stomach at that age.

As, however, the composition of human milk alters very considerably as lactation proceeds, losing proteids while gaining in fat and sugar, the latter two in smaller proportion than the first, the matter becomes more complicated, and indicates the importance attaching to modification of the constitution as well as the strength of artificial articles of food as age advances.

Thus, as the results of investigation show that certain quantities of food elements are necessary for healthy development, the total amounts of mother's milk able to yield them, divided by the figures for the capacity of the stomach, will indicate the general maxima possible for each meal, less than which would be more rational for use in practice. Thus—

	New-Born.	One Month.	Two Months.	Six Months.	Nine Months.	One Year.
Proteid (grs.) . .	106·2	212·3	305·6	362·6	435	507·6
Fats	193	386	580	543	772	900
Sugar	280	560	830	934	1121	1310
Salts	12	24	32	40	48	56
Human milk (oz.) .	10·25	20·75	29·5	35	42	49
Meals	6–7	6	5–6	5	4–5	3–4

These figures afford an approximately correct indication of what is normally required by infants to maintain healthy growth at different ages, and the quantities of their natural food required to provide it.

But 63·5 parts of cow's milk contains as much proteid as 100 parts of human milk, 95 parts as much fat; and 116 parts are required of it, to give as much sugar as in this quantity of human milk. Cow's milk, therefore, needs dilution to lessen the proportion of proteids and fat, along with addition of sugar to the diluted solution, to bring its percentage of sugar up to the human average. So all artificial foods for infants should properly be conceived upon the same lines. But as human milk, as lactation progresses, gradually loses some of its proportion of proteids, and gains both in fat and sugar, the articles of food intended to be given to children of different ages should, if nature's laws are to be accurately followed, vary correspondingly.

Humanised Milk.

(Aylesbury Dairy Co., Ltd., London—Life Belt Brand.)

The preparations supplied by this company are without doubt in the front rank of the substitutes for mother's milk made from milk from the cow, ever offered to the public. Humanised milk is furnished in two forms, Nos. 1 and 2. No. 1 contains less casein, and therefore affords less curd than No. 2, and is adapted specially for infants of weak digestive powers. Both forms are entirely prepared from milk, and milk alone, the sugar added in preparation consisting of lactose. They are perfectly sterilised by a patent process, in which no chemical agent is employed, and are supplied in patent air-tight vacuum-stoppered bottles, to open which a small puncture through the soft metal cover is only required, the negative pressure within dispersing. After long periods of time, the contents of the bottles are found to be perfectly fresh and sweet, the only change which may occur, should it be much shaken in transit, being some formation of butter. The milk is supplied in the form so nearly identical in composition with human milk, that no dilution or additions are necessary; if the surface of the milk in the bottles be covered by a clotted layer of cream, as may happen if kept for some time, or if some of it has been churned into butter, the bottle is to be placed in water hot enough to raise the temperature of the milk from 90° to 100° F. for a short time, fifteen to twenty minutes, when the cream will be distributed again, or the butter melted and can be skimmed off the surface after opening.

In addition to the ordinary kinds of humanised milk, the company supply sterilised preparations of natural cow's milk, peptonised milk, prepared whey and cream, all of which, although primarily intended for the use of invalids of more advanced years, may be with advantage employed in special cases for the modification and fortifying of infants' ordinary dietary.

Supplies of these preparations can be obtained at once through the post, and regular consignments arranged for. The price of a pint of humanised milk is given at 8d. a bottle.

HUMANISED MILK.

(Friern Manor Dairy Farm, Ltd.)

THIS form of humanised milk is prepared from formulæ given by Dr. Gaertner, in his description of the well-known process associated with his name. The milk is sent out in glass bottles, closed by stoppers protected with indiarubber, and tightly apposed by means of a metal wire lever arrangement. The milk itself, as submitted to us, is perfectly fresh, shows no tendency either to curdle, or to form a layer of more or less adhesion, or shaken into the form of butter or cheese; has a specific gravity of 1000 in 26, and is practically amphoter to litmus. To taste, it is absolutely indistinguishable from fresh milk, having none of that flavour, caused by sterilisation with heat, so often unpalatable to infants, as well as to adults, and at the same time causing the constituents of the milk to become less digestible.

Another recent process for the preservation of milk has been devised by Mr. T. K. Freeman. In this instance the milk is put up in bottles similar to the ordinary soda-water bottle, closed by a glass-ball, through the agency of gas under pressure. The method of sterilisation of the milk is said to consist of an action on the milk by means of vitalising gases under pressure, whatever that may imply. The milk treated in this way is kept fresh, but the opening of the bottle is attended with a somewhat awkward forcible expulsion of milk and cream spray, destructive both to clothes and surroundings. The milk itself appears to be satisfactorily preserved and of good flavour.

MILKMAID BRAND SWISS MILK.

(Anglo-Swiss Condensed Milk Co., Cham, Switzerland.)

THE Milkmaid Brand of Condensed Milk can be unhesitatingly recommended as a reliable preparation of whole unskimmed milk, to which nothing has been added save pure sugar. Fourteen parts of water to one portion of the milk go to form an efficient substitute for mother's milk for infants newly born; as the child grows older less and less water is to be added,—never, however, in smaller proportion than seven parts to one of the milk. The water used should be boiled beforehand, but mixed with the milk only after cooling, while the milk itself is not to be boiled, but simply warmed to 100° F. Five ounces by weight of the milk (four tablespoonfuls), with three-quarters of a pint of water, represent a pint of ordinary milk, plus some sugar. In cases where infants have to be brought up upon the bottle, where fresh cow's milk, as obtainable, is of doubtful purity, and special supplies of milk, humanised, sterilised, etc., are impossible by reason of expense or of locality, the Milkmaid Brand of Condensed Milk may be confidently employed, and may be regarded as a trustworthy and valuable food for infants, which will not readily sour, is of uniform composition, and of most palatable taste.

"FRAME FOODS."

(Frame Food Co., Ltd., Battersea, London.)

THE preparations of this company comprise the "Frame Food Diet," "Frame Food Jelly," and "Frame Food Extract." They are all obtained from vegetable sources, and are intended principally to be added to milk. The "Frame Food Diet" is a cooked food made from cereals, to which much of the soluble phosphates, albuminoids, and other nutritious matter of the bran, has been added. It is particularly rich in proteids and in phosphates, its starch granules are almost entirely broken up, while it contains only ½ per cent. of moisture. The proteids present are in the proportion of 16·3 per cent. to 81·6 per cent. of carbohydrates, or as 1 to 5. It is palatable, nutritious, and of easy digestion; while a further merit possessed by it is afforded by its comparative cheapness. A third of an ounce made up with milk and water, one-third and two-thirds respectively, when boiled slowly for about six minutes, produce a capital food for young infants.

The "Frame Food Extract," which gives the special nourishing value to "Frame Food Diet," and "Frame Food" Jelly, is extracted from wheat bran, contains a large amount of phosphorus, about ten times as much as in ordinary flour, no inconsiderable proportion of proteid, and about 48 per cent. of carbohydrates. The ash, equal to 10·7 per cent. of the extract, is practically all soluble. The preparation is in fact a most valuable form, in which vegetable proteids, more easily digested than the nitrogenous substances of vegetable origin usually are, may be given, and so rich in phosphoric acid that it might almost be regarded as a phosphatic tonic.

The "Frame Food Jelly" is composed of the "Frame Food" extract and pure sugar, and may be used in place of jams, syrup, or treacle for young children.

PURE DRY OLD COGNAC BRANDY.

(E. Archer & Co., Great Malvern.)

THE sample of Old Cognac Brandy sent us by E. Archer & Co. merits the description of "dry and pure." It has a fine, old, and smooth flavour about it; no trace of crude roughness; no sign of "doctored" spirit. Containing 47 per cent. of alcohol by volume, between 0·65 to 0·7 per cent. of extractives, about 0·02 per cent. of ethereal substances, and an acidity of 0·03 per cent., the brandy in composition is all that a good specimen should be, while the palate, often a more delicate judge than chemist's analyses of the true origin of delicately flavoured articles, divines that it is a true example of the best brandies, by appreciation of its aroma and richness. As patients are frequently better suited by brandy than by any other common stimulant of an alcoholic character, and as the purest brandy is the safest, it is of importance to have samples like this one, upon which implicit trust can be placed.

"FRIAR'S" SOAPS.

(Friar's Soaps Co., London.)

AN excellent example of a fully superfatted soap, containing no free alkali, and with a faint but agreeable perfume, comes to us from this company. Making use of a practical opportunity, a trial was recently made of it in very "hard" water, with most satisfactory results. Its use renders the skin fresh, clear, and soft. A variety also is supplied which contains some eucalyptus oil in it, not sufficient to give it other than a pleasant odour—nor enough, we might dare add, to prove of any antiseptic value. Eucalyptus itself, however, has a soothing effect on the skin, and it is better perhaps to look to this than to hope for more powerful results. Antiseptic soaps are yet to be. Another form in which this article is provided is that of shaving-soap tablet, which makes a good lather, and at the same time, soothing the skin like all superfatted soaps, helps the possessor of a tender or inflamed chin to escape much of the discomfort attendant upon his matutinal self-torture.

ELLIS'S TABLE WATERS.

(R. Ellis & Son, Ruthin, North Wales.)

BEFORE this we have expressed our approval of the many varieties of non-alcoholic effervescing waters sent out by this firm, but are glad to have been afforded another opportunity of sampling these products, especially during the hot weather of this summer. Potash, soda, seltzer, lithia waters; they are all first-class. Champagne-lemonade, ginger-beer in stone bottles, and ginger-beer in glass, are pleasantly flavoured, not over-sweetened, nor taste too strong of their different adjuvants. All the samples received were contained in bottles fitted with the old-fashioned cork wired down; would it not be better to supply them in bottles stoppered in more modern and convenient fashion? The cork of a bottle of strongly charged fluids is rather apt to prove not quite up to its business, when it is somewhat short and the top is naked.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,
MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING JULY 29, 1899; AND FOR THE YEAR FROM JANUARY 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	57°·0	[1] 398° [2] 1229°	0° 649°	2·8	16·4	142	839	2°·6
Observed	58°·5	[1] 462° [2] 1337°	0° 669°	2·7	19·5	112	856	2°·17
Difference	+1°·5	[1] + 64° [2] +108°	± 0° +20°	−0·1	+3·1	−30	+17	0°·43

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH DUNDEE, ABERDEEN, AND LEITH), DURING JULY, AND SINCE JANUARY 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 989 [2] 7,976	173·3 199·4	224 1574	39·3 39·3	98 765	17·1 19·1	134 1595	23·5 39·8	114 889	20·0 22·2
Actual Deaths and Rate per 10,000	[1] 873 [2] 7,906	152·7 197·6	214 1638	37·6 40·9	101 746	17·6 18·6	82 1410	14·3 35·2	122 945	21·4 23·6
Difference from Mean	[1] −116 [2] − 70	−20·6 − 1·8	−10 +64	−1·7 +1·6	+ 3 −19	+0·5 −0·5	−52 −185	−9·2 −4·6	+ 8 +56	+1·4 +1·4

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 72 [2] 478	12·6 11·9	31 204	5·4 5·1	61 609	10·6 15·2	112 796	19·7 19·9	46 336	8·1 8·4
Actual Deaths and Rate per 10,000	[1] 82 [2] 501	14·3 12·5	24 193	4·1 4·8	47 648	8·1 16·2	85 783	15·2 19·6	61 388	10·6 9·7
Difference from Mean	[1] +10 [2] +23	+1·7 +0·6	− 7 −11	−1·3 −0·3	−14 +39	−2·5 +1·0	−27 −13	−4·5 −0·3	+15 +52	+2·5 +1·3

* NOTE.—The figure [1] denotes the data for July, [2] for year to date.

The four weeks ending 29th July were warm, without much sun, with a normal rainfall, and with a small daily variability of temperature. The most striking feature was the large excess in accumulated day-degrees over 42°,—64°, or 16 per cent. of the total expected,—the mean temperature itself showing 1°·5 over the normal.

From the beginning of the year, the accumulated day-degrees over 42° give 104° in excess of the average, or over 8 per cent. as to that figure. The rain still shows a large surplus, the hours of bright sunshine a small excess.

To these favourable meteorological conditions the vital statistics for July correspond. The total deaths show a deficiency equal to 11·7 per cent. of the number looked for, those from respiratory causes a similar difference, equal to as much as 38 per cent. Only digestive diseases and cancer afford appreciable increases; the latter, however, amounts to 33 per cent. above its normal total.

Influenza was given as the cause of three deaths.

The data for the first seven months of the year now show a decreased total mortality; increases under constitutional, nervous, and digestive diseases, pneumonia, and especially under cancer (15 per cent. to average figure); and a remarkable decrease in the figure for deaths from respiratory diseases (11 per cent. of mean).

In July, therefore, warm but cloudy, with a low variability of temperature and a normal rainfall, the total deaths were below the average; the deaths from respiratory diseases were especially few, those from cancer especially numerous. The year to date, rather warmer and wetter than usual, practically gives the same result.

EDINBURGH
MEDICAL JOURNAL.

ORIGINAL COMMUNICATIONS.

JAUNDICE IN SOME OF ITS ASPECTS: A CLINICAL LECTURE DELIVERED AT ST. BARTHOLOMEW'S HOSPITAL.

By T. Lauder Brunton, M.D., LL.D., F.R.S., *Physician to St. Bartholomew's Hospital, London.*

The subject that I have chosen to talk about to-day is one of the cases which we lately had in "Elizabeth" Ward. You may remember that the patient was a woman, æt. 55. On looking at her, it was observed, first, that she was thin; secondly, that she was deeply stained of a yellow colour; and, thirdly, as could be seen, even from the other side of the ward, that the abdomen was greatly distended; so much was it distended, that it formed a large protuberance which was hardly covered by the bedclothes. First of all, on looking at her from the other side of the ward, it seemed probable that she must be suffering from cancer of the liver. The reasons for supposing that this was the disease with which she was affected were, that the abdomen was so distended and that the face was so thin. These symptoms indicated rather advanced disease of the liver, but these two symptoms might perfectly well occur without there being any malignant disease of the liver; because you can see precisely those same symptoms in a patient, æt. 41, in "Rahere" Ward. In this case the abdomen was just as large, the face was hardly so thin, but still it was thin. There was, however, one marked difference between the two: the woman in "Elizabeth" Ward was deeply jaundiced, the man in "Rahere" was not jaundiced; his face was sallow, but there was no jaundice. Now, when I went to examine the case in "Elizabeth" Ward, I expected to find the liver enormously enlarged; in fact, I had come to my diagnosis too rashly, and, as we often find when we act rashly, I was wrong. I percussed the liver, and I found that instead of being enlarged above the normal size, it appeared to be rather smaller; the edge of the liver could not be felt below the margin of the ribs. This, however, did not show that the liver was actually smaller, because it might have been pushed up by the distension of the abdomen, and post-mortem examination revealed that this was the case—that the liver was very nearly of normal size, perhaps a little larger than usual. It was certainly not smaller than normal, and the apparent diminution in size was really due to displacement of the organ by its being pushed up by the intestinal distension.

In diagnosing a case, we have always to work backwards from what we see to what we do not see, and in both these cases we find abdominal distension, which is a common symptom. We may then take a little trouble over this symptom, and inquire to what it is due. Distension of the abdomen may be due to several causes. The most common of all is distension by flatus; next to that in frequency comes distension by fluid; and, lastly, distension by the growth of some solid mass contained in the abdomen. Not infrequently, we find that the distension is of a double origin, and consists partly of an increased amount of gas in the intestines and partly of an increased amount of fluid in the peritoneal sac. Now, we may proceed to ask, why is gas present in the intestines at all? Well, gas is present in the intestines of healthy persons, first of all because air is swallowed, and although the oxygen of the air is rapidly absorbed, the nitrogen does not so quickly disappear, and a good deal of that passes into the intestine. Secondly, a good deal of gas is apt to be formed in the intestines by the decomposition of food, and more especially of those foods which contain a quantity of cellulose, for, in its decomposition in the intestine, this substance seems to give rise more particularly to marsh gas: these are the two principal sources of gas in the intestines. But the gas would be much more plentiful in the intestines if it were not for the fact that a large proportion of it is absorbed by the vessels. This absorption occurs, for some gases, with great rapidity. For example, it occurs very rapidly in the case of oxygen, and also in the case of sulphuretted hydrogen. Sulphuretted hydrogen, indeed, is absorbed so rapidly from the intestine that it may give rise to poisoning and death. This rapid absorption was denied by Claude Bernard, who stated that sulphuretted hydrogen could not be absorbed so rapidly from the intestine as to produce any general symptoms, because, he said, although no doubt it is absorbed quickly from the intestine, it is so rapidly excreted by the lungs that you never get any bad symptoms from it. Orfila, from previous experiments, had come to a different conclusion; and Dr. Cash and I, when working at the action of carminatives upon the gases of the intestine, found that sulphuretted hydrogen could be so quickly absorbed from the rectum and colon of an animal as to give rise to general poisoning. We therefore stated that a practice, at that time in vogue, of treating phthisis by injections of a mixture of carbonic acid with sulphuretted hydrogen, was not without danger. It was at that time supposed to be absolutely harmless; but, unfortunately, shortly after our paper was published, a case occurred of death through the absorption of sulphuretted hydrogen, which had been given as a cure in a case of phthisis.

You can readily see that if absorption be lessened in any way through interference, for example, with the general circulation, by disease of the heart, or through local interference with the circulation in the abdomen by disease of the liver, there will be a tendency to accumulation of gas and to flatulence. Now, we find that flatulence is a marked symptom both in diseases of the heart and of the liver. You will frequently find that patients who are suffering from mitral disease complain very much of flatulence, and to this kind of flatulence the term "heart-wind" has sometimes been given. In the first stages of that disease of the liver, known as cirrhosis, where the portal vessels are just beginning to be slightly compressed by the contracting hepatic tissue, we find that wind is very apt to come on; that the abdomen becomes much distended, and, at first sight, we are tempted to think that the patient is suffering from dropsy. On percussing the abdomen, however, the whole of the abdomen may be resonant; there may be no dulness even in the flanks, or in any dependent part of the abdomen, and so we come to the conclusion that the patient is suffering simply from flatulence. As the contraction of the tissues around the portal vein goes on, however, we find a further symptom; not only is absorption of wind diminished, but absorption of fluid is also interfered with. The arteries supplying the abdominal viscera still carry on the circulation vigorously, a free flow of blood takes place through the intestines, and a quantity of tissue juice is effused from the capillaries; but instead of this being taken up by the radicles of the portal vein and carried on into the general circulation, the veins being obstructed, absorption is imperfect, and so the fluid tends to collect in the abdomen, giving rise to an accumulation of fluid in the large lymphatic, or peritoneal sac; for the peritoneal sac, as you know, is simply a large lymph space. In this space the fluid accumulates, so that in the later stages of cirrhosis we have not only a great amount of wind, but a great deal of water; and patients will very often tell you, when they are in the first stage, that they themselves are afraid of water accumulating in the abdomen. Their fears are by no means unfounded, for, as a rule, the accumulation of wind is succeeded by the accumulation of water. Now, as I have just mentioned, this accumulation of wind and water has certain secondary effects. It tends to displace the diaphragm, to drive it upwards into the thorax; it interferes with the respiration, making the patient short of breath, and not infrequently it interferes with the heart, tending to make the patient giddy or even faint. You remember the position of the heart, diaphragm, stomach and intestines. Should the latter be distended by flatus, the diaphragm tends to be driven up, and if driven up by the distension of the abdomen it must needs displace the heart, and this displacement of the heart may give rise to certain circulatory symptoms, such as those of faintness. At the same time certain changes are produced in the size of the liver. In a normal condition of the liver the absolute dulness just comes to the sixth rib; but in the case of D. E. we found that the absolute dulness, instead of reaching the sixth, came up as far as the fourth rib, so that the position in which the man's diaphragm was standing was as I have mentioned, and it was this same displacement of the diaphragm that gave rise to the apparent diminution in the size of the liver in E. C.'s case.

We have now considered one at least of the most important causes of the distension which occurs in certain diseases of the liver, but there is another cause which must also be taken into account, that is, the possibility of increased circulation through the arterial system, viz. dilated arteries, as well as obstructed venules. If there is any irritant present in the abdominal cavity, it tends to cause dilatation of the arteries, and dropsy may occur without there being any very great obstruction to the backward passage of blood through the portal vein. This happens, for example, in cases of peritonitis, where there is no definite obstruction to the vein, but where the arteries become more dilated, as they always do in cases of inflammation, wherever the inflammation may be.

We may now turn from the symptom of distension to the other symptom which we found in E. C.'s case, and also in D. E.'s case, namely, of emaciation. You can readily see that such distension of the abdomen will tend to interfere mechanically with the taking of food, because pressure will be so exerted upon the stomach that it will not be able to take in food readily. But this is only one way in which interference with the liver tends to interfere with digestion in the stomach. It is well to remember that all the blood in the stomach must find its way through the liver before it reaches the general circulation, and if the circulation through the liver is obstructed, congestion of the stomach is likely to result. This congestion of the stomach is very apt, indeed, to show itself by vomiting, and by a catarrhal condition generally. The catarrh you judge of partly by the appearance of the tongue, which is frequently thickly coated, but you become more certain of the existence of catarrh by the actual evidence of the vomited matters. When a person has catarrh of his nose, or, as we generally term it, a cold in the head, you may diagnose the presence of this cold from the somewhat nasal tone which his voice takes; but if you go entirely by the nasal tone you might be wrong in diagnosing a cold in the head, or, as we may term it, a catarrh of the nasal passages, in a stranger. It might be that he had got polypi in his nose and not catarrh; but if you saw him blow his nose and a quantity of mucus came out, your diagnosis is certain—that man has a catarrh in his nose. If you find that a patient brings up a large quantity of mucus when he vomits, then you know he has catarrh of the stomach. This catarrh is what we frequently find in cases of cirrhosis of the liver, and it often evidences itself by a tendency to retch or vomit in the morning just after the patient gets out of bed, and to bring up a thin, watery, almost tasteless fluid, with thick ropy mucus. So much is this the case, that we very often diagnose a patient's habits by the fact that he brings up this mucus and watery matter in the morning when he rises. Therefore, when a patient complains of this symptom, you generally ask him what he takes at night before he goes to bed, because whisky and water for supper are very apt to produce vomiting in the morning. In cases of life assurance, in which many of you will be probably concerned, it is a good thing to know that you can sometimes get useful information regarding the habits of your patient without his suspecting it. Possibly some of you know that life assurance societies are very chary about taking the lives of those who are addicted to intemperance; but if you ask the man who is proposing to insure his life whether he is intemperate or not, the chances are that you will hear that he is very temperate indeed; and if you ask him how much alcohol in any shape he takes in the course of the day, you will find that he mentions a quantity well within the normal limits of a temperate man. But if you ask him, "Have you a good appetite in the morning," he says, "Oh dear no, I cannot eat my breakfast." "You are sometimes sick before you take your breakfast?" "Yes, I am sick, and I bring up a lot of thick stuff, and sometimes a lot of water; I am always sick in the morning, and never have any appetite for breakfast." Then you know that your patient is almost certainly suffering from intemperance. It is not invariable; you will find the symptom in some cases of chronic malaria, where the liver has been disturbed by residence in the tropics for a number of years, and in bad malarial fever we get the same symptoms, although the patient may be perfectly temperate. But these two conditions, viz. gastric catarrh and hepatic congestion, are almost the only ones where you get this sickness in the morning and want of appetite for breakfast. From this interference with the stomach we have a lessened amount of food taken, a diminished quantity of food digested, and consequently there is a tendency to emaciation. The same thing holds good for the intestines, and the mere pressure upon the intestines tends to prevent accumulation of materials within them; we frequently find that in cases of interference with the circulation through the liver, the bowels incline to be loose, often being opened three or four times a day, or even more. In this there is a liability to lessened absorption even of such food as has been digested, and also a tendency to emaciation. There was emaciation in both the cases I have referred to, but in one of them we got no jaundice, in the other jaundice was present to a marked degree.

Now, jaundice depends upon the presence of highly coloured matter in the tissues, and it reaches the tissues through the blood. When I was a student, the view was held that bile pigment was formed in the blood and was excreted by the liver. This view has now been given up, and it is now held that bile pigment is formed only in the liver. In my student days there were therefore two divisions of jaundice—one was called hæmatogenous and the other hepatogenous. The hæmatogenous jaundice was that due to increased formation of bile pigment within the blood and lessened excretion through the liver; hepatogenous jaundice was due entirely to the diminished excretion from the liver. This view of the hæmatogenous origin of jaundice was given up for a while, but it has now reappeared under a somewhat altered form. The altered form is, that we no longer consider that bile pigment is formed in the blood, but we do consider that alterations in the blood may lead to a very greatly increased formation of bile pigment in the liver; so that we may really get a kind of jaundice, the starting point of which lies in alterations in the blood. Although the pigment may not be formed directly in the vessels, yet it is formed from altered blood, and the alteration takes place in the liver; so that there is certainly some ground for the old view of hæmatogenous and hepatogenous jaundice. The hepatogenous jaundices are, however, much more frequent, and much more practically interesting, inasmuch as the hæmatogenous is generally associated with such severe blood changes that medical art has very little power over it, whereas over hepatogenous jaundice we are frequently able to exercise a great influence and to do in many cases a great deal of good.

Jaundice is generally due to interference with the flow of bile out from the liver, and this may be due to many causes. One of the most common causes is a catarrhal condition, either of the duodenum or of the bile ducts. This catarrhal condition thickens the mucous membrane of the duodenum and tends to obstruct the opening of the common bile duct; or the catarrh may be present by itself, and so plug the duct by a thick cork, as we may term it, of mucus. This catarrhal jaundice is generally recognised by its having very few symptoms. The patient does not emaciate, and there is very little to be found on examination except that perhaps the liver is a little larger and a little more tender than usual, so that pressure upon it makes the patient wince. Catarrhal jaundice, as a rule, runs a course of its own, and although you may do some good, I confess that I do not think a very great deal can be done for it. As a rule, catarrhal jaundice runs a course of about six weeks. You may get it cleared away in less than that time, but I have never been quite certain whether its disappearance in a shorter time was due to the remedies or simply to the course of the disease.

There are two special classes of catarrhal jaundice, namely—(1) that which is due to thickening of the duodenum itself; (2) that which is due to the presence of mucus in the duodenum. In the case where the catarrh is present in the duodenum, it usually begins in the stomach, spreads to the duodenum, and then involves the bile duct; and the symptoms you get in such cases are, that the patient for two or three days before the jaundice is a little sick, a little out of sorts, has not very much appetite, and feels a little qualmish. In the cases where it seems to begin in the bile duct itself, there are no symptoms whatever, and the patient goes out one fine morning, and he meets a friend, who says, "You are very yellow to-day." He goes back and looks in the glass, and finds that he is yellow, but if it were not for the yellowness he would be perfectly well; and he comes simply to get the yellowness removed. As a general rule, you give him a blue pill, or a pill containing either mercury or calomel. One generally gives a mercurial pill with some rhubarb, podophyllin, colocynth, or other purgative, and a saline aperient to follow. This I suppose sometimes does good; at any rate, it is the general treatment, and you may then prescribe some nitro-hydrochloric acid, bismuth, or salicylate of soda. All these drugs are used in cases of catarrhal jaundice; sometimes they do good and sometimes they do not.

Now, in the case under consideration, we had evidently two things to deal with. We had certainly obstruction to the bile ducts, and we had evidently obstruction to the radicles of the portal vein. The bile ducts might have been plugged by something else than a plug of mucus. Six weeks, as I have said, is the usual course for ordinary catarrhal jaundice, but you may get a plug consisting of a solid gall stone impacted in the gall bladder, that may remain a very long time. As a rule, however, such an impaction is preceded by a considerable amount of pain. Then, again, you may have a pressure exerted upon the gall bladder by something without. I shall read this case, because it is one of great interest; and I may tell you that my diagnosis was malignant disease of the head of the pancreas, because I found the swelling of the abdomen and this interference with the bile duct, which was clearly due to something that involved the bile duct and the radicles of the portal vein, not the portal vein alone, nor the bile duct alone, but the two together. In the case of the man in "Rahere," we had distension, emaciation, and symptoms of interference with the portal circulation, but there were no symptoms of interference with the bile duct. In a case of catarrhal jaundice we find symptoms of interference with the bile duct, but no symptoms of interference with the portal circulation. As a rule, in cases of impaction of a gall stone, there is interference with the bile duct, but no interference with the portal circulation. In the case which we are discussing, however, we have to deal with something that would interfere both with the portal circulation and with the bile duct.

It seemed to me, then, most probable that there would be some growth pressing upon the liver, affecting at the same time both the bile duct and the portal vein. This is met with not infrequently in cases of disease of the liver itself, where a malignant growth is present in the body of the liver, and this was what I thought was present before I examined the abdomen. In such a case, we would almost certainly have had a large projecting liver, probably nodulated on the surface. This was not present, and I did not find anything that was increasing the size of the liver, yet I thought it was increased in size; I came, therefore, to the conclusion that there was something pressing very much upon the portal vein and the bile duct, and also seriously interfering with nutrition, because the woman was very much emaciated. My diagnosis, therefore, was malignant disease of the head of the pancreas, which was pressing on the bile duct and on the portal vein.

Now, you will see from the history of the case, and from the post-mortem examination, that although this was not altogether correct, yet the indications were to a great extent correct. What I ought to have done properly was to put an intermediate step as to what we really knew, or were almost certain was present, viz., that there was some growth pressing upon the bile duct and upon the portal vein at the same time, and then state as the next step—this is probably malignant disease of the head of the pancreas. I will say that there was a growth pressing upon the bile duct and portal vein, but whether the pancreas was involved I do not quite know. The head of the pancreas was hard, and a section will be made of it. Let me read the notes of the case.

E. C., æt. 55, married, was admitted complaining of weakness, jaundice, and pain in the back—weakness due to imperfect nutrition, jaundice due to pressure upon the bile duct. The pain in the back was not definitely explained. She was well until four months ago, when she sustained a severe mental shock concerning family affairs. Soon after this she noticed her motions white—interference either with the flow of bile or pancreatic juice into the intestines, because white motions do not always indicate interference with the flow of bile, but may be due to interference with the pancreatic juice. Her skin was becoming yellow. This clearly showed obstruction to the flow of bile. At the same time the urine became very dark in colour, and she began to have pain in the back, the darkness of the urine going with the yellowness of the skin. Jaundice came on gradually, and there had never been severe attacks of paroxysmal pain. This seemed to indicate that we had not to do with any gall stones, because in a gall stone the jaundice comes on, as a rule, very suddenly, from impaction of the gall stone in the duct. Since Christmas the abdomen has begun to swell. Vomiting has been very persistent. There is much difficulty in keeping down even fluids; never any blood in the vomit. She has lost flesh all the time. On admission she was deeply jaundiced and very emaciated, with very little appetite. There was a yellowish-white fur on the tongue, which was moist; there was a quantity of bile in the motions, which was a curious point. The abdomen was 38 in. round; dull everywhere in the umbilical region. Change of dulness from side to side was readily obtained. The liver dulness commenced under the lower border of the fifth rib in the right axillary line. The organ could be felt below the costal arch anywhere. No other organ felt. There was a little dulness in the lungs, with deficient respiration, and so on, but nothing of any great importance; the heart apex beat in the fourth space, no murmur. There is a considerable cloud of albumin. The abdomen was tapped, and nine pints of fluid deeply tinged with bile were removed. The patient was eased for a little while, but not for long, and she very quickly filled up again and sank.

At the post-mortem examination it was found that practically most of the organs were healthy; the abdomen contained a certain amount of fluid. But here is the interesting point—the great omentum was enormously infiltrated with new growth, the lesser omentum was almost equally infiltrated. The whole of the peritoneal surface was dotted with new growths, especially well marked in the pelvic region, and some of this growth had become ulcerated. The retroperitoneal glands were infiltrated, and the mesentery was shortened and contained much fat. The intestines were matted together by some scanty adhesions, which easily broke down, so that the small intestine was removed with no difficulty, but the cæcum was fastened down so as to cause some difficulty in getting it away, also the ascending colon. The gall bladder was not enlarged, but it contained 153 gall stones, although, note well, the woman had never had any symptoms of gall stone; and this is a point to be very carefully borne in mind, that you may have large numbers of gall stones in the gall bladder and never a symptom of gall stones at all. They varied from the size of a pin-head to that of a small marble, were brownish-black in colour; also some granular detritus. The wall of the gall bladder did not seem to be involved in the new growth surrounding it at its upper part and filling up the portal fissure. The duct and portal vein were both lost in the great infiltration of the lesser omentum, and it was this new growth that was pressing upon both the portal vein and the duct. So complete was this pressure that no bile could be squeezed into the duodenum. Immediately in the neighbourhood of the portal fissure the new growth had extended into the liver. There was a small round deposit on the surface of the right lobe. The surface of the liver was thickened and adherent. The weight of the liver was 70 oz.; it was enlarged, but not much, and full of bile. The pancreas did not seem to infiltrate, but a piece of it has been sent to the museum for microscopical examination.

Here, then, is a case which shows you very clearly how far we are able to diagnose correctly certain conditions connected with the liver, and how far also we are liable to be mistaken. The indications which were afforded by the jaundice, the distension, and the emaciation, clearly pointed to some growth interfering with the flow through the portal vein and through the hepatic duct. The emaciation indicated that the nature of this growth was malignant. The slow and gradual onset of the jaundice seemed to show that there was no gall stone present, although, as we found afterwards, gall stones were there. The slow growth would indicate, I ought to say, that the disease was not due to gall stones, and not due to impaction of the gall stone on the duct. This long continuance indicated that it was not of a catarrhal nature. I was practically driven to the conclusion that there was a growth somewhere in the portal fissure, and probably it was at the head of the pancreas. So far as the diagnosis was concerned, *i.e.* that there was a growth pressing upon the portal vein and upon the hepatic duct, it was correct; and the exact nature of this diagnosis was also correct, in so far as a malignant growth was diagnosed. But the supposition was, that this growth started in the head of the pancreas, and then pressed upon the portal vein and the hepatic duct, whereas the growth appears possibly to have started around the gall duct. It might have been due to the pressure of gall stones, but it might also have been due, and in all probability was due, to the presence of an ovarian cyst which had ruptured and had caused irritation through the peritoneal cavity; for the whole of the peritoneum and the whole of the abdominal cavity were studded with new growths.

In this case, therefore, we have a well-marked instance of how far we can diagnose, and how far we are liable to error. The question of treatment in such a case was, of course, limited to the amelioration of symptoms. All that we could do was simply to evacuate the fluid when it became so great as to distend the abdomen, to relieve the weakness by the administration of stimulants, to give such foods as could be kept down, and, where necessary, to ease the pain by morphine. More than that we could not do, but in some other cases we can do a great deal of good; the consideration of such cases we must postpone till another occasion.

PRINCIPLES OF REFLEX ACTION.[1]

By G. A. Gibson, M.D., D.Sc., F.R.C.P.Ed., *Senior Assistant Physician, Royal Infirmary; and Lecturer on Clinical Medicine, School of Medicine, Edinburgh.*

Living beings are brought into relation with their environment by means of many different vital processes, amongst which responses to stimuli hold an important place. From the wide realm of nature numberless examples may be taken. Some of these are comparatively simple in their nature. The mimosa, or sensitive plant, folds its leaves on irritation of any kind. You are all acquainted with the scarlet pimpernel, better known perhaps as the poor man's weather-glass. When the weather is dark and lowering, this fair little flower closes its petals and waits till the clouds pass; but so soon as the sky clears, it unfolds its floral envelope and expands in the sunshine. The actinia, or sea-anemone, draws in its rays and shuts its mouth when an irritant is applied to it. When a bright light falls upon the eye of one of the higher animals, the lids at once close and the pupil contracts. These are examples of responses to stimuli, culled from widely different natural domains, yet all of a very simple character.

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[1] Part of a clinical lecture delivered in the Edinburgh Royal Infirmary.

There are others, however, which are extremely complex; to one or two of these you will allow me to call your attention. They belong for the most part to the category of what have been termed the co-ordinated reflex phenomena, and are in their essence instances of complex reflex action. Many examples of such activities are to be found in the works of writers on Natural History. Let me, as an instance, mention an interesting phase in the life-history of the yucca moth, fully described by Kerner.[1] This is a beautiful silvery insect, which immediately on leaving the chrysalis flits to one of the flowers of the yucca plant, takes a quantity of pollen from the flower, and kneads it into a little ball; with this it flies off to another flower of the same kind; then with its needle-shaped pincers it bores into the lower part of the pistil, in which it deposits its eggs, and, ascending to the top of that part of the plant, it deposits the ball of pollen. Thus, by one series of acts it at once fertilises the flower and provides for the nutrition of its progeny. This, to my mind, is one of the most marvellous of the instinctive activities, as they are called; it is certainly performed without any conscious intention on the part of the insect; the extremely complex movements are carried out without any previous education, and only occur once in a lifetime. They are examples of complex reflex action. There are many others in higher life. In Lloyd Morgan's charming work[2] there are some observations on the movements of young fowls. He points out that immediately after birth many of these animals perform the most complicated movements, with wonderful accuracy of inherited co-ordination. They at once walk about and peck at all small objects, while in the case of aquatic birds they take to the water almost as soon as they are born. The Duke of Argyll,[3] actually saw a young moor-hen dive down to escape some danger in the water, immediately after it had left the egg. Its muscular movements were as perfect as if it had been trained. Now, these animals had not gone through any period of education; they had but lately left the egg, and had therefore had no opportunity of acquiring skill in the use of their muscles.

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[1] "Natural History of Plants," translated by Oliver, vol. ii.

[2] "Habit and Instinct," London, 1896.

[3] *Contemporary Review*, 1875.

These are good examples of what have been called the congenital instinctive activities or inherited complex reflex action. These facts are brought before you, in order to show you instances of simple and complex acts of the kind; and it has to be remembered that there is no line of demarcation between simple reflex acts and those which are more complex. You all know that if you tickle the sole of the foot of a sleeping child, the child draws up the leg or kicks out. You further know when the functional integrity of the spinal cord is divided in any way, that on tickling the sole of the foot there is again a powerful response; it has been found in animals that this response can be produced with the greatest ease, and the amount differs very largely with the grade of development of the animal. The lower the animal, the greater the response. The higher the animal, the less the response. This simply means that the brain is developed at the expense of the lower portion of the nervous system. The brain is the progressive part of the nervous system. If the lower part is severed from the upper there are more complicated responses in the lower than amongst the higher animals. You know that, after a frog has been beheaded, if the sole of the foot is stimulated, there is at once a withdrawing of that foot; if it be held firmly, and stimulation be still applied to it, the animal will take its other foot and try to brush away the irritation. That is seen in many amphibians. Higher in the realm of nature the response is smaller. A rabbit, for instance, will draw away its foot, but will not make use of the opposite limb to get rid of the irritation.

Reflex action seems to have been first grasped by the celebrated philosopher Descartes. He was apparently the first to grasp the significance of the fact that if an object is brought somewhat suddenly towards the eye there is an involuntary response, that we know as winking.

Unzer in his "Principles," published in 1771,[1] and translated long afterwards by Laycock, deals in a most interesting manner with the effects of external impressions on the nerve-centres, and their results as seen in muscular movements. He clearly understood that such movements could be evoked by influences which did not reach the brain, and that their effects were experienced and transformed lower down.

Prochaska,[2] so far as is known to me, in 1784 elaborated for the first time the scientific conception of reflex action. He described in a manner which is most suggestive "the reflexion of sensorial into motor impressions," and mentioned "that this reflexion may take place, either with consciousness or without consciousness." This, however, is not all. Prochaska further indicated that many of these "reflexions" were independent of the brain, and due to the action of lower centres. Both of these men were far in advance of the times in which they lived, and their views unfortunately sank into forgetfulness.

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[1] "The Principles of Physiology," translated and edited by Thomas Laycock, *Syd. Soc. Translation*, 1851.

[2] "A Dissertation on the Functions of the Nervous System," translated and edited by Thomas Laycock, *Syd. Soc. Translation*, 1851.

Almost half a century after the appearance of Prochaska's work, Marshall Hall[1] brought into prominence a classification of different forms of nervous phenomena, and more particularly emphasised the excito-motor or reflex functions. These he described as being the result of an impression conveyed by an exciter nerve to a centre, and reflected back to a muscle or set of muscles by a motor nerve.

The difference of opinion between Prochaska and Marshall Hall seems to be this, that Marshall Hall regarded reflex action as something in which sensibility played no part. Prochaska simply defined it as one in which there might be total unconsciousness, and George Henry Lewes,[2] in his criticism, points out most clearly the distinction between want of sensibility and want of perception. Lewes asserted that sensibility must play an important part in reflex action. Some part of the animal must feel, and in consequence of the feeling there is a response. Sensibility is doubtless distributed over the whole nervous system, wherever there is a receptive nerve-centre, and this sensibility is absolutely essential to all reflex acts, yet it may nevertheless be unconscious. Sensibility then is present, but may be unperceived; that is to say, there may be no perception, in the higher centres, of what has taken place. Lewes[3] describes a triton whose spinal cord had been cut through about the middle of the body, so that the animal practically had two segments; when one of the hind legs was placed in a shallow vessel of water, on the edge of which the animal stood, it moved so as to bring the whole of the posterior segment into the water. It is clear that in such an instance the spinal cord must have some kind of selective activity.

It is obvious that, for the production of a reflex act, there must be a means whereby a stimulus is received, a path by which it is transmitted in a centripetal direction, a centre in which the stimulus causes some reaction process, a channel by which the resulting impulse is conveyed in a centrifugal direction, and provision for its elaboration in the form of muscular response. Translated into the phraseology of the day, reflex action depends upon the integrity of the reflex arc, composed of neurons belonging to the lower level. A stimulus received by the sensory arborisation of the neuron of the posterior root, is transmitted, by the contiguity of its dendrites, to the neuron of the anterior grey matter, whence it passes by the emergent axon to the corre-

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[1] *Phil. Trans.*, London, 1833; "Lectures on the Nervous System and its Diseases," London, 1836; "New Memoir on the Nervous System," London, 1843.

[2] "The Physiology of Common Life," Edin. and London, 1860.

[3] *Ibid.*, vol. ii. p. 253.

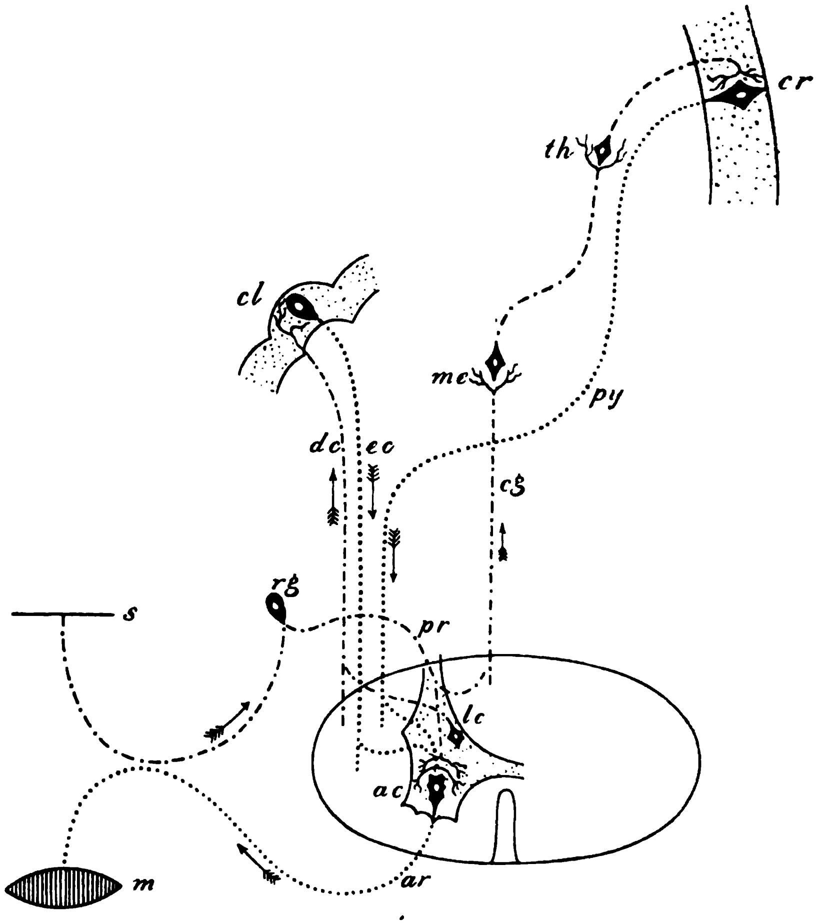

FIG. 1.—*s*, Afferent or sensory nerve; *rg*, ganglion of the posterior nerve root; *pr*, posterior nerve root; *ac*, anterior cornu; *ar*, anterior nerve root; *m*, efferent or motor nerve; *cg*, afferent cerebral tract; *me*, medulla oblongata; *th*, optic thalamus; *cr*, cerebral cortex; *py*, efferent cerebral tract; *dc*, afferent cerebellar tract; *cl*, cerebellar cortex; *ec*, efferent cerebellar tract; *lc*, Clarke's column.

sponding muscle or group of muscles. The neurons of the upper level, however, play an important part in ordinary reflex action by the exercise of a controlling influence. The neuron of the posterior root, under ordinary circumstances, transmits an impulse to the large neuron of the cortex, whence it is reflected downwards to the multipolar cell of the anterior spinal neuron. When these are rendered incapable of receiving and transmitting impulses, the reflex actions carried out by the neurons of the lower level become increased in their intensity. We know nothing of the effects arising from the centripetal neurons in this connection, but we know that any interference with the axon of the great cortical neuron increases reflex action. Thus the conclusion is obvious, that the upper level neurons exert a controlling or inhibitory influence upon those of the lower level. This, however, is not all. Lesions of certain portions of the brain, instead of increasing the reflexes, cause their diminution, or even their total abolition. This seems only explicable in the manner suggested by Gowers,[1] that there is a still higher mechanism, by means of which the neurons which habitually inhibit reflex action are themselves controlled.

Reflex action plays a very important part, not merely in vital processes, but in those by which we adapt ourselves to our surroundings. It is customary to divide the different reflexes, so called, into three distinct categories—those which are organic, or on which life itself depends; those which are cutaneous or superficial, by which we largely adapt ourselves to our surroundings; and, finally, those called the deep reflexes, which are intimately associated with the integrity of the muscular system.

The reflexes commonly called organic are those by which the life of the higher animals is largely subserved, and the processes of digestion, of circulation, of respiration, are carried out by these organic reflexes. Some of these functions, such as those of deglutition and of evacuation, are very closely bound up with the central nervous system indeed, and thus come to be of great value to us, from the point of view of diagnosis. Others are much less under the control of the central nervous system, and do not therefore affect so particularly the diagnosis of disease.

The cutaneous reflexes, by means of which the body is very largely brought into relationship with its environment, consist in muscular movements, in response to stimuli applied to the skin. The movement is usually single, but may be complex; it is more or less extensive, according to the general condition of the individual, the nature of the stimulus, and the region to which it is applied. According to physiological facts of universal acceptance, the interval of time which elapses between the stimulus and the response varies between ·05 and ·09 second. Such responses are in every sense truly reflex in their origin.

The muscle and tendon responses, first carefully investigated by Erb and Westphal, stand upon another plane. They are contractions of muscles produced by mechanical stimuli. The muscles must be in a condition of moderate, yet involuntary tension. These responses have been the subject of much discussion; by some observers they have been regarded as true reflex actions, and have thus been termed tendon reflexes, while other authors have held them to be direct responses, and have given them names which do not beg the question, such as knee-jerk, tendon response, or other names of no special import.

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[1] "Diseases of the Nervous System," 1899, vol. i., third edition.

One of the most important considerations in this discussion is concerned with the interval of time elapsing between the stimulus and the response. Tschirjew,[1] Gowers,[2] and Waller[3] have found that the time interval in the case of the knee-jerk is a little over ·03 second. Now it is well known that the time which would be required for the production of the knee-jerk, if it were a true reflex act, would be from ·06 to ·07 second.

Quite recently, Gotch[4] has carried out some most instructive investigations on the same subject. In order to determine the characters of the muscular contraction, he did not employ the whole limb, but the vastus internus, which, as Sherrington[5] showed, plays an important part in the production of the knee-jerk.

A rabbit having been etherised and fixed, the skin was divided, and the vastus internus muscle defined. That portion of the common tendon with which its fibres are associated was then detached from the patella and cut across, so that the muscle could be separated from its neighbours.

The tibial end of this muscular strip was attached to one arm of a lever by a thread which traversed a small pulley. The thigh was then fixed, and the vastus itself steadied by passing under its deeper part a piece of cork. To this cork the muscle was carefully attached by pins, whilst the cork was fixed to a rigid stand. By this arrangement the vastus muscle attached to the lever was independent of any passive movements of the tibia, and the recording lever was in no way affected by the shake caused by a tap on the patella or its ligament.

The partially separated slip of muscle was seen to contract throughout its whole length every time the ligamentum patellæ was struck with the knee flexed. Each contraction, when recorded, was found to be such as is obtained from a single twitch of the muscle, evoked either directly or indirectly in response to a single electrical stimulus of the muscle or its nerve. The twitch in response to the tendon tap occurred, whether the separated vastus was stretched taut by a weight, or allowed to lie lax upon the other muscles of the thigh. One essential factor in its production is a degree of permanent pull upon the unaltered portion of the ligamentum patellæ. This exerts a constant tension upon the upper fibres of the vastus muscle; on cutting off the whole ligament the response fails, but returns as the tendon is stretched.

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[1] *Arch. f. Psychiat.*, Berlin, 1878. [2] *Med.-Chir. Trans.*, London, 1879.

[3] *Brain*, London, 1880; and *Journ. Physiol.*, Cambridge and London, 1890.

[4] *Journ, Physiol.*, Cambridge and London, 1896.

[5] *Proc. Roy. Soc. London*, 1893.

The contraction of the strip, in response to the tendon tap, was influenced by conditions, of which the following were the most important:—(1) The general condition of the animal, deep narcosis abolishing it; (2) the condition of the patellar tendon, the stretching of the tendon by flexing the knee being essential for its maintenance; (3) the integrity of the reflex arc associating the muscle through its motor nerve with sensory impulses; any impairment in these nervous connections abolished it. The strip contraction was thus undoubtedly a portion of such muscular activity as produces the well-known knee-jerk.

The unavoidable loss of time from mechanical and other factors is calculated by Gotch as being about ·002 second. From a long series of observations he has found that the response to a tap on the patellar tendon is very short, being only ·005 second, and as from this the error has to be deducted, we may conclude that the contraction follows the stimulus after so brief a period as ·003 second. It is quite clear that the reaction of the vastus to the tendon tap cannot be brought about by stimulation of its motor nerves, and still less by reflex excitation; the time for either is far too short. The reaction can only be the result, therefore, of direct mechanical stimulation of the muscle, probably from sudden stretching by the blow on the patellar tendon. The results of Gotch thus confirm Waller's conclusions.

It seems that the excitability of the vastus muscle is maintained by the presence of the reflex arc; and if so, then the reaction, though direct in its origin, is only possible when the muscular excitability has been brought up to and maintained at an adequate pitch. This is effected, under normal circumstances, by nervous influences descending constantly to it from the spinal cord. The experimental proof of this view is, however, wanting. It should be possible to obtain demonstrable evidence of alteration in the excitability of the vastus muscle, occurring in consequence of central nervous influences. All endeavours to reinstate the response after its abolition by section of the anterior crural, by such agents as electrical stimulation of the nerve, have failed, as shown by Tschirjew.[1]

That the response is direct, is conclusively proved by another series of observations, also published in the same paper. It is well known that a crossed response is sometimes observed, the direct knee-jerk on the side excited being followed by a contraction of the muscles on the other side. This has been the subject of some interesting researches by Gotch. The tracing, which is here reproduced, shows three curves—the upper gives the moment of producing the tendon tap; the lower shows the direct contraction of the vastus internus of the limb stimulated;

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[1] *Arch. f. Psychiat.*, Berlin, Bd. viii.

the middle gives the response of the vastus internus of the opposite side.

The average result was, that an interval of ·025 second occurred between the stimulus and the response on the same side, while an average delay of ·110 second took place between the stimulus and the contraction on the opposite side. It is impossible to doubt that, while the response on the side excited is a direct effect of the stimulus, that on the other side is a true reflex.

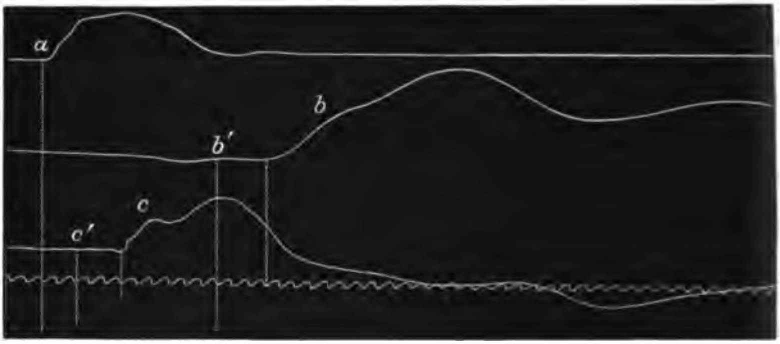

Fig. 2.

Such are the facts of those responses, direct and indirect, by which the body is brought into relation with its surroundings. Every day of our work in the wards of the Royal Infirmary you will be brought face to face with the modifications of these actions during our systematic analysis of the symptoms of our patients, and it will then be my duty to point out to you in detail the different features of these phenomena in various regions.

THE CLINICAL ASPECT OF IRITIS.

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When we consider that a very large percentage, 75 per cent. probably, of cases of iritis are due to constitutional dyscrasiæ, or toxins circulating in the system, causing auto-intoxication, or interfering with the central cerebral functions, which may or may not have previously manifested themselves in other organs of the body,—when we realise the destructive influence of this complaint, often exhibited on the visual functions in a short space of time, and therefore the necessity of the early recognition of such a disastrous malady, and the suffering produced locally by it, which is one of the symptoms chiefly complained of by the patient, —then it is evident that the clinical aspect of the disease is one that should be studied carefully, and is bound to be a matter of interest to every practitioner of the art of healing.

As a rule, such diseases as acute or subacute rheumatism, secondary syphilis, and diabetes, come into the hands of the general practitioner, or the physician or surgeon, long before the symptoms in the eye draw the attention of the patient to that organ; and as the various phases of these diseases may develop more prominent and painful phenomena in other parts of the system, it is quite possible that the early symptoms of iritis, appearing in conjunction with these, may, by comparison, seem insignificant to the patient, who may thus make light of them to his medical attendant, and thus the local disease may have considerably advanced before it is brought into line, and local treatment applied. Fortunately, may one say, pain is such a prominent symptom of acute iritis that the arthritic and other pains, and the various developments of the diseases in other parts, must be very severe indeed to completely overshadow it. There is, indeed, perhaps only one pain referred to in the eyeball that eclipses it, namely, that of acute glaucoma, which is of a bursting nature, from excessive tension of the tunics of the eyeball, the result of the outward pressure of the retained fluids. Nevertheless, one must not be led to think that iritis cannot be present without severe pain; it is a symptom that varies in intensity, but is more often very acute. When, however, the inflammation comes on gradually, pain may be absent. The character of the pain is paroxysmal, referred to the eyeball and side of the nose and parts around the orbit, of a lancinating, cutting, or throbbing type, similar to neuralgia; the patient shrinks from examination, more from photophobia, spasm of the muscles, and general nervousness, than from the actual pain of being touched, unless the case be complicated with cyclitis, when palpation over the ciliary region causes exquisite pain, and is the chief symptom to note in the differential diagnosis between iritis with and without accompanying inflammation of the ciliary body. The eye waters, the tears being hot and excoriating the skin where they drain away over it.

The iris is anatomically complex and, functionally, is most important, regulating as it does the amount of light falling on the retina, acting as a protecting curtain when exposed to excessive illumination, which would otherwise injure the delicate nervous apparatus in the retina, and also aiding the sharpness of vision by cutting off the peripheral, aberrant rays, and only allowing those that pass through the centre of the lens to become focussed on the retina. The slightest disorder of this important organ, the iris, occurring, hyperæmia is reflected on the external ocular membrane, the iris being also the anterior termination of the vascular tunic of the globe. Besides the redness of the conjunctival vessels, there is observed congestion of the anterior ciliary vessels in the zone surrounding the cornea, the vessels in the episcleral tissue, causing the appearance of a pink or pinkish purple ring around the cornea, these vessels not being emptied by pressure with the finger radiating from the corneal centre, as are the conjunctival vessels when subjected to the same pressure. In rheumatic iritis there is often seen a greyish zone between the pink zone and the corneal margin. Pain and redness with a certain distribution are therefore two prominent symptoms; as in all inflammations, the pain is often worse at night, even when no specific disease has yet manifested itself.

In acute iritis we also find a considerable amount of general constitutional disturbance, rise of temperature, acceleration of the pulse, and alimentary troubles, vomiting, indigestion, diarrhœa. Loss of acuity of vision is not, as a rule, complained of until turbidity of the aqueous humour, or exudation into the pupillary area, manifest themselves. These changes in the contents of the anterior chamber, due to inflammation and swelling of the anterior endothelium of the iris and posterior surface of the cornea (Descemet's membrane), with the outpouring of inflammatory products into the anterior chamber, cause a dulness, or want of lustre of the iris, the usual colour and brilliancy being obscured by the loss of transparency of the aqueous humour and the cloudy swelling of the endothelium. The area of the pupil is at times also seen occupied by these inflammatory products. The iris, examined by means of oblique illumination and with a powerful lens, may also be seen to have new vessels developed on its surface, chiefly on the corona, the zone which lies between the pupillary and ciliary zones; and the colour compared with the other (if unattacked) eye, will be seen to be altered, blue and grey eyes taking on a muddy greenish hue from the yellowish exudation in the anterior chamber, and the irides of darker people a more reddish hue than usual. Should the iritis have advanced insidiously, and so not have been recognised until a later stage, deposits of uveal pigment from the posterior pigmented layer of the iris may be seen on the anterior surface of the lens capsule, and little tags of lymph, also pigmented from the same source, may be detected at the pupillary ring or inner margin of the iris, extending from it and fastening it to the lens capsule.

It will next be observed that the motor function of the iris muscle is interfered with, the pupil is practically immobile or very sluggish in action, contracted, and does not respond to the influence of light. To test the mobility of the pupil, place the patient with his face towards the brightest light entering the room, and cover up one eye. Then place one hand in front of the eye which is to be tested, and, after waiting a few seconds, remove it smartly. If normal, or approaching the normal state, the pupil will be found dilated, and it will rapidly contract again, now that it is exposed to the light once more; but should hyperæmia or inflammation of the iris be present, it will not dilate far, if at all, and in acute iritis, at any rate, not perceptibly to the naked eye, so there will be on re-exposure only a small amount of contraction, or none. If synechiæ are partially binding down the edges of the iris, it will only dilate at the parts left free between the synechiæ.

To test the mobility of the pupil for accommodation, direct the patient to look at a distant object, this time with his back to the source of light, and the pupils will be seen to dilate when he looks at the distant object, and to contract when he is asked to look at an object held about twelve inches distant in the normal state. In iritis the loss of the motor function of the iris is accounted for by the increased vascularity causing a thickening of the organ, spasm of the sphincter muscle from irritation of the ciliary nerves, which also accounts for the diminution of the size of the pupil as compared with that of the fellow-eye, unless it also be affected. Even now the pupil, small as it is, may be observed to be irregular in shape, not perfectly round, but oval or mis-shapen, and somewhat eccentrically situated. This becomes very apparent when a mydriatic, which may now be applied for that purpose, has been used, and which will act as a great aid to diagnosis.

In young persons, or older ones if the pupil be contracted, and the anterior chamber well formed, and the tension of the eyeball be normal, that is just capable of being dimpled by the pressure of the finger when one finger is used to steady the globe, and another to press on it close by, or when pressure by the finger on the globe (through the eyelid in all these cases) causes the pupillary margin corresponding to that point to be displaced towards the centre of the pupil,[1] a drop of atropine solution, of the strength of 2 or 4 grs. to the ounce (the liquor atropinæ sulphatis, B.P., is somewhat stronger, 17½ grs. to 4 oz.), or a lamella should be applied; and if, after waiting twenty-five or thirty minutes, the pupil be fully and equally dilated, iritis may be excluded, but if it should not dilate fully and equally, it will either (*a*) not dilate at all, on account of the presence of complete posterior synechiæ (exclusion of the pupil), or (*b*) only incompletely, from the spasm not being overcome, the branches of the third nerve supplying the contractor muscle of the iris not being sufficiently paralysed, or partially, the pupil margin being held down at points by synechiæ, but being free to dilate between these points; a common shape for the pupil to take under these circumstances is more or less like the ace of clubs in a pack of playing cards. These phenomena, when taken in conjunction with the other symptoms mentioned above, point to the presence of iritis.

Under the influence of atropine drops, some synechiæ may give way, but the little spot of uveal pigment left, where it was attached to the lens capsule, remains; it is derived from the retinal layer of pigment cells, has a strong pathological affinity to the lens capsule, and, as it is never absorbed, indicates at future periods past attacks of iritis.

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[1] In excess of tension the pupil dilates under this pressure. I find this a great confirmatory aid to the diagnosis of the presence or absence of abnormal tension, but have not seen it described elsewhere.—*Author.*

When total posterior synechiæ exist, the iris may be bulged forward in its central zone, while the pupillary margin is still tied down, owing to the aqueous humour accumulating behind it; the condition is known as iris bombé.

In cases of iritis complicated with cyclitis, the whole posterior surface of the iris may be bound down by the plastic exudation to the anterior surface of the lens capsule (total posterior synechiæ), in which case there will be no bulging of the iris, and no dilatation of the iris can take place; it will eventually atrophy.

Iritis is divided into two varieties—(1) Plastic, and (2) serous. As the name implies, much adhesive material is exuded in the former variety; and posterior synechiæ, and occlusion, or filling in of the pupil with the exudation, are therefore common. In the latter, the serous form, the exudation is thinner, the aqueous humour is turbid, and changed in colour from exudation of lymphoid cells; and the outflow into the canal of Schlemm being obstructed, the fluid in the anterior chamber becomes increased in quantity, creating a tendency to increased tension of the globe, so that the case may become complicated by glaucoma.

This sufficing for a general clinical description of iritis, there are a few points to be alluded to, under the headings of the different diseases which iritis is found to complicate. In syphilis, which accounts for some 50 per cent. of the total cases of iritis, Fuchs says at least 50 per cent., and various authorities place it at from 42 to 70 per cent., one eye at a time is generally attacked, or, at any rate, the worst symptoms are expended in the one eye before the second one is attacked. The second eye generally suffers, however, if constitutional treatment be delayed. It is a secondary symptom of syphilis, appearing often simultaneously with the secondary skin eruption. It varies in intensity from mild to severe, its prognosis is good under prompt and suitable treatment, restoration to full vision may be looked for with considerable confidence. In cases of syphilis, gummata or lymph nodules of the iris are occasionally found accompanying iritis, affecting both eyes, and complicated by cyclitis. This belongs to the later secondary stages, where treatment has not been fully exhibited. The presence of these gummata is pathognomonic of syphilis. They appear at the margin of the iris, are often multiple—little vascular nodules of a reddish-yellow appearance. In the hereditary form in infantile syphilis, iritis is very rare. Hutchinson[1] says it is amongst the rarest of the symptoms of hereditary syphilis. It has to be carefully looked for, as the symptoms are comparatively mild. If treated early with mercury, and locally with atropine, the prognosis is good. However, in interstitial keratitis, a common form of inherited syphilis at a later period, there is frequently a coexisting iritis. When slight, the prognosis is good, but if severe, the inflammation may spread to other parts of the uveal tract, the ciliary body causing cyclitis, or the choroid, choroiditis resulting, and leading to chronic disease of the eye, ultimately ending in staphyloma, or in shrinking of the eyeball. Syphilitic iritis throws out a large quantity of lymph, and thus, if the pupil be not kept well dilated, synechiæ may form in awkward situations.

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[1] "Commentary," xcv.

From these remarks it must not be inferred that iritis is a regular accompaniment of syphilis; indeed, though syphilis accounts for 50 per cent of the cases of iritis, only a small proportion of syphilitics suffer from iritis, and a gummatous tumour of the iris, if solitary, may exist without iritis. Again, it sometimes happens that the iritis of hereditary syphilis becomes, comparatively speaking, conspicuous, while the keratitis referred to above is less prominent, and may even be absent. More rarely, iritis breaks out in the later stages. When keratitis is present, there are often little punctate spots on the cornea (keratitis punctata).

Iritis, it is said, may arise from simple exposure to cold in those who are in indifferent health, and the unilocular iritis occurring in secondary syphilis is by some accounted for in this way, as, were it due to the blood dyscrasia, one would expect the eye on both sides of the body to be affected, as is the case with the skin eruptions and other phenomena of the secondary stage.

Iritis from exposure to cold, in the same way, is sometimes called rheumatic without any other rheumatic phenomena being present, but there is also a definite rheumatic iritis, accounting for from 9 to 23 per cent., according to different authors, of all cases of iritis, occurring in connection with acute or subacute rheumatism, or in the course of rheumatoid arthritis, attacking one or both eyes, accompanied by waves of acute pain, and with a great tendency to relapse or recur (recurrent iritis). A prominent objective symptom of rheumatic iritis is the diffuse redness of the whole eyeball. Most often one eye is attacked, but both may be. Iritis is a frequent accompaniment of gonorrhœal rheumatism, attacks both eyes, one after the other; and at the same time, as the joints are affected, it is not so paroxysmal, but is persistent, and apt to be destructive; and should a gleet remain uncured, there will be a tendency for it to relapse. It usually occurs in the subjects of hereditary gout.

There is also a much severer plastic type of iritis, fortunately rare, occurring in the acute stage of gonorrhœa, probably produced by direct inoculation; gonoccoci have been found in pus from gonorrhœal iritis. A gouty history of ancestors is often traced in females with arthritic iritis, this form being very destructive, and often insidious in its course. Plastic in nature, it may go on to occlusion of the pupils. An arthritic or gouty history is almost always traced also in glycosuric iritis. There is often in this type a copious exudation of morbid materials into the anterior chamber, forming hypopyon. When cataract of diabetic patients is operated on, there is a special danger of iritis setting in. About 5 per cent. of diabetic cases suffer from iritis. Out of 144 cases Knies found 5 per cent. with it. In relapsing fever it is occasionally present; the course is protracted, but the prognosis good. It is rare, but does occur sometimes as a complication in variola, typhus, pneumonia, leprosy, tuberculosis, and scrofula. Trauma is responsible for a certain number of cases, mechanical wounds of the cornea or sclerotic, blows on the eyeball, septic ulcers, certain chemical substances, more especially copper and mercury, entering the globe.

It is also a prominent feature of sympathetic ophthalmia, a description of which does not come within the scope of this paper.

The sequelæ of iritis, when the treatment has been omitted, or begun too late, are—(1) Formation of posterior synechiæ binding down the margin of the iris, so that the mobility of the pupil is interfered with; (2) occlusion of the pupil, or filling in of the pupillary space with membrane formed from the inflammatory exudates, causing permanent dimness of vision, but, if uncomplicated, no future dangers; (3) exclusion of the pupil, with iris bombé, not necessarily causing dimness of vision, if the pupillary area be free, but interfering with the escape of fluids into the canal of Schlemm, giving rise to excess of tension, and destructive glaucoma is always to be feared as a further complication; (4) total posterior synechiæ, when cyclitis is also present, followed by disorganisation of the globe.

As regards the treatment of iritis, it should be both local and constitutional, the latter, of course, being that of the disease or diathesis to which it belongs, and a description of which does not fall in the province of this paper. The old idea that mercury should be administered in all cases of iritis, holds good so far, that as the majority of cases, as we have seen, are due to syphilis, therefore the majority of cases must be treated with mercury; also, it may be administered as an absorbent of fibrinous materials, as in traumatic iritis, and that of sympathetic ophthalmia, but the idea that it is a *sine quâ non* in all cases is now quite exploded. The principles of local treatment are, to relieve pain and congestion, to prevent synechiæ forming in situations where the uveal pigment will afterwards interfere with vision, to keep the pupil open and free and at rest, and away from the lens, the distance between the iris and lens increasing *pari passu* with the amount of dilatation, and, where synechiæ have already formed, to attempt to break them down. Later on, surgical treatment to relieve tension, or to free the pupil when occluded, etc., may become necessary, but what we now want to draw our attention to, is the immediate local treatment.

When the iris is hyperæmic, and the pupil appears very small, pinpoint pupil, even before actual inflammation has manifested itself, a mydriatic should be applied. Atropine sulphate in solution, 2 grs. to 4 grs., or lamellæ, $\frac{1}{5000}$ gr., is the one usually employed, its effects lasting some days; it dilates the pupil, relaxes the ciliary muscle, and puts the iris at the nearest point possible to rest, the important factor in the treatment of all inflammations. In certain cases where atropine cannot be administered, on account of an abnormal sensibility to the effects of the drug, duboisin sulphate, $\frac{1}{5000}$ gr. in lamellæ, can be used; it is a more powerful mydriatic, and unpleasant symptoms may arise—giddiness, headache, even delirium—so it should be administered cautiously. Hyoscinæ hydrobromidium or scopolamine is another substitute said to possess much more mydriatic power than atropine. Ophthalmic discs of hyoscine, $\frac{1}{500}$ of a grain, are made, or a drop of solution, $\frac{1}{2}$ gr. to the ounce, is strong enough to use at first. Sulphate of daturin, 2 grs. to the ounce of water, is another substitute. Where only hyperæmia of the iris exists, or in cases where prolonged mydriasis is unadvisable, as in old people with a tendency to glaucoma, or where cyclitis is present in addition to iritis, and in which the tension varies frequently, hydro-bromide of homatropine (lamellæ $\frac{1}{100}$ gr.) may be used, its effect being less lasting, passing completely off in about twenty-four hours. It can be used at intervals of four hours to keep up the mydriasis.

For the relief of congestion, a couple of leeches, each of which is calculated to take away $1\frac{1}{2}$ drms. of blood, may be applied to the temple, close by the outer canthus, and, if thought advisable, the bleeding can be encouraged after removal of the leeches. The artificial leech is preferred by some surgeons. Arteriotomy may be resorted to for the same purpose, the anterior branch of the temporal artery being chosen for this. A puncture is made in the vessel, and when sufficient blood has been evacuated, the vessel is divided, and the ends allowed to retract. It is rarely necessary to proceed to this in iritis, where sufficient effect can be got by leeching and hot fomentations. Atropine also assists by contracting the blood vessels. Pain is relieved partially by the atropine, by hot fomentations, by counter-irritation, blisters to the temple, injections of morphine, opiates by the mouth, or laudanum applied on the fomentations, by the application of cold to the eyeball, by means of ice-pads or Leiter's tubes. Ung. aconitini, a small piece rubbed on the brow and down the side of the nose and temple, often gives relief, and cocaine drops, alone or combined with the atropine, when the conjunctiva is irritable, may be used occasionally. Exclusion of light by darkening the room is also an adjunct to rest and to the alleviation of pain; this can be got in a modified way by the use of dark glasses or goggles, or by a shade placed over the eyes.

Besides the above local treatment, local surgical treatment is sometimes necessary in acute cases; when tension of the eyeball is persistent and excessive, after mydriatics have been stopped and pilocarpin used, or the two used alternately, a paracentesis of the anterior chamber becomes necessary. It lets out the turbid fluid in the anterior chamber, relieves the tension, and helps to free the block in the drainage system, at the space of Fontana. If repeated paracentesis fail, iridectomy, after grave consideration, may even become necessary.

A description of the surgical procedures for the relief of the sequelæ of iritis, and for preventing the recurrence of the same, does not come under the heading of this paper, in which I have endeavoured to give a sketch of the aspects of iritis as it may appear in the course of an illness, as a complication of the same, or may present itself to the practitioner any day in his consulting-room.

THE RELATIVE EXCRETION OF THE NITROGENOUS WASTE PRODUCTS IN A CASE OF LIVER ABSCESS.[1]

By William Bain, M.D., M.R.C.P. (Lond.), *Harrogate*.

Our knowledge regarding the influence of the liver on the intermediary products of proteid metabolism has been to some extent derived from analysis of the urine, therefore it is important in hepatic disease to make quantitative estimations of urinary constituents likely to be affected either absolutely or relatively by impairment of its functions. Results indicating abnormal metabolism have already been obtained in certain diseases of the liver. For example, in cirrhosis the preformed ammonia is increased at the expense of the urea, while in acute yellow atrophy a similar change occurs, viz. a considerable increase in the former associated with the almost total disappearance of the latter. Until recently, it was generally held that the urea was markedly diminished in phosphorous poisoning, but Munzers'[2] researches negative this view. Indeed, there is an increase in the urea relative to the nitrogen excretion resulting from tissue disintegration. The uric acid and phosphoric acid are greatly increased, the increase in the former corresponding to, and in the latter being relative to, the increased nitrogen excretion. The preformed ammonia is also augmented, due probably to a diminished alkalinity of the blood. Lactic acid is frequently present.

Although one scarcely expected to find any marked deviation from the normal in a case where only a portion of the liver was affected, still it was considered probable that an examination of the urine might reveal some slight modification in the relative excretion of the nitrogenous waste products.

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[1] From the Physiological Laboratory, St. Thomas's Hospital, London.

[2] *Deutsches Arch. f. klin. Med.*, Leipzig, 1894, Bd. xii.

For permission to examine and report the following case I am indebted to Mr. Makins, surgeon to St. Thomas's Hospital:—

CASE 1.—C. P., æt. 31, was admitted into St. Thomas's Hospital on 17th November, and died on 23rd December.

History of the case.—Last July he had, when in China, an attack of dysentery which lasted two weeks. Three weeks later the attack recurred, and persisted for about a month, being accompanied by jaundice. On the voyage home he began to suffer from slight pain in the right side and under the right shoulder. On admission the liver dulness was found to begin above at the fifth rib in the nipple line, and extended downwards to the umbilicus. He was operated upon the same day, the liver being exposed but not explored. The wound was dressed with cyanide gauze. On 21st November a trocar and cannula was inserted into the liver, when about 40 oz. of chocolate-coloured pus welled up. The wound continued to discharge large quantities of fluid daily. The sediment from this fluid was examined by Mr. Shattock, who found it to consist of necrosed liver cells. There was a moderate degree of pyrexia, and the patient became progressively weaker, and gradually sank.

Post-mortem appearances.—On opening the abdomen there was evidence of peritonitis beneath the under surface of the liver, chiefly in the region of the right lobe and round the head of the right kidney. The liver was greatly enlarged, both downwards and upwards, its anterior surface in the upper part being firmly adherent to and incorporated with the diaphragm. Incision showed that the right lobe of the liver was the seat of some six abscess-like areas, mostly still solid, but commencing to soften in places. The average size of these areas was that of an orange, their form rounded, whitish or greyish in colour, and they were distinctly marked off from the surrounding liver substance. Where the softening was in the early stage, their substance was channelled by small excavations, giving them a honeycombed appearance. In others its advance was indicated by the welling up of thick greenish pus, and it was one of these that had been drained by operation. The left lobe of the liver was entirely free from such areas, but contained a few firm white nodules, in diameter about the size of an ordinary lead pencil. The substance of the right lobe was obviously diseased, being of a mottled red and white colour. In both kidneys the cortex was thickened, and also abnormal in appearance, being much streaked and congested. There was an ulcer in the small intestine, and another at the upper end of the rectum. These penetrated to the muscular coat, which was covered with pus, and their edges were thinned and raised. No other change was apparent in the mucous membrane. The remaining organs were normal, and no further evidence of septicæmia was observed.

The analysis of the urine included the determination of the total daily excretion of urea, uric acid, phosphoric acid, ammonia, and alloxur bases. Lactic acid was estimated on one occasion.

Methods of analysis.—For the estimation of urea the hypobromite method was employed, the solution being made afresh each day.

Hopkins' method was used for estimating uric acid, Schlösing's method for ammonia, and phosphoric acid by titration with uranium nitrate.

In estimating lactic acid, 1 c.c. of a 25 per cent. solution of sulphuric acid was added to 100 c.c. of urine, and then barium hydrate until no more precipitate appeared. The baryta was precipitated by passing a stream of carbonic acid gas through the solution, which was then filtered, and the filtrate evaporated to a thin syrup over a water bath, the temperature of the bath not exceeding 70° C. About ten volumes of alcohol were gradually added to the syrupy fluid, and then evaporated. This was repeated, and afterwards a few drops of dilute phosphoric acid added to the residue, which was then extracted with an excess of ether. The ethereal solution being separated and carefully evaporated, the solid material which remained consisted entirely of lactic acid. This was dried and weighed.

To determine the alloxur bases, Salkowski's recent method was adopted. 500 c.c. of urine were taken on the first five days, but only 150 c.c. on the two remaining days, as the quantity excreted was small. The phosphates were precipitated by ammonia and magnesia mixture, and removed by filtration. Three per cent. silver nitrate solution was then added (6 c.c. to 100 c.c. of the filtrate), and after brisk stirring the whole set aside for an hour or more in a dark place. Some of the supernatant fluid having been examined to see if there were a sufficiency of silver, the solution was filtered, and the precipitate washed chlorine and silver free. The magnesium silver urate was then decomposed by passing H_2S in acid solution through it. The fluid was now heated, filtered, and evaporated to dryness on a water bath. The residue was treated with about 30 c.c. of dilute sulphuric acid (17 c.c. H_2So_4 to 900 c.c. aqua distillata) brought to the boiling-point, and left in a cool place for about twenty hours. The precipitate (uric acid) was then collected, and washed with dilute sulphuric acid. The filtrate and washings, amounting to 50 c.c., were rendered ammoniacal, silver nitrate added; the precipitate so obtained was filtered, washed chlorine, silver, and sulphate free, and then incinerated in a porcelain capsule. The ash obtained was extracted with dilute nitric acid, and the silver estimated by titration with NH_4CNS.

From this silver determination the amount of alloxur base is calculated from the average amount of silver contained in the silver compounds of the different bases.

As it was impossible to put the patient on a fixed diet while the urine was being analysed, the diet chart is here inserted.

Diet in the twenty-four hours.

13*th December.*—No record.

14*th December.*—Six pints of milk, one egg, one sponge cake, leg of pheasant, six pieces of thin bread and butter, one round dry bread; brandy, 6 oz.

15*th December.*—Five and a half pints of milk, three pieces dry bread, three pieces thin bread and butter, leg of rabbit, plate of pudding, one egg, four plain biscuits.

16*th December.*—Three and a half pints of milk, two pieces of bread, one round of bread and butter, one plate of mutton, one plate of milk pudding; brandy, 6 oz.

17*th December.*—Three and a half pints of milk, two pieces bread and butter, one egg, wing of chicken, one piece of dry bread, one pint of arrowroot with egg beaten up; brandy, 6 oz.

19*th December.*—Four pints of milk, one egg, custard pudding, one round bread and butter, half slice of bread; brandy, 6 oz.

20*th December.*—Half pint of milk, one egg, two pints of tea, half pint of coffee, two basins of arrowroot, one piece of toast; brandy, 6 oz.

The results obtained by the methods described are here collocated:—

TABLE—*Showing the Quantitative Estimations of the more important Constituents of the Urine in the twenty-four hours.*

Date.	Quantity in C.c.	Urea in Grms.	Uric acid in Grms.	Phosphoric acid in Grms.	Ammonia in Grms.	Alloxur bases in Grms.	Lactic acid in Grms.
Dec. 13	778	22·414	·787	1·073	·661	·07391	
,, 14	820	14·824	·529	1·066	·721	—	
,, 15	762	21·008	·702	·617	·583	·069973	
,, 16	1050	20·180	·704	·851	·848	·06687	
,, 17	1088	21·876	·622	·957	·925	·06044	
,, 19	460	12·344	·601	·598	—	·087029	
,, 20	480	13·276	·537	·680	·450	·06315	·360
Averages	765	17·974	·64	·834	·698	·069	·36

Taking into consideration the diet, and excluding lactic acid, the results obtained must be regarded as coming within the normal physiological limits.

Notwithstanding the negative character of these results, they are interesting inasmuch as they show us that, although portions of the liver were distinctly diseased, yet its functions were apparently efficiently performed. Regarding urea and ammonia, no comment is necessary.

The phosphates are undoubtedly diminished, but this diminution is evidently due to the character of the food ingested. The greater part of the phosphoric acid in the urine is directly derived from the ingesta, but a small part is a decomposition product of phosphorised organic materials such as nuclein. If the same amount of phosphate were taken in the food each day, the variations occurring in the excretion of phosphoric acid would be a measure of the amount of disintegration of nuclein containing tissues.

Sarcolactic acid is not a constituent of normal human urine. In this case it was only estimated once, when the patient was in a semi-moribund condition, and as it has been observed in many diseases shortly before death, no importance can here be attached to its presence.

The interest in uric acid arises chiefly from the influence it is supposed to exercise in the causation of gout. The amount excreted in health varies considerably in different individuals, and this variation by no means necessarily depends upon the food taken. If a healthy subject is placed upon a fixed diet, other conditions remaining as much as possible the same, the excretion still shows daily variations. If the uric acid were derived entirely from the ingesta, the only possible explanation of this variation would be that, although the food taken was the same in kind and quantity, the amount assimilated varied, but as this is more or less of an assumption there is another supposed origin of this acid which will be considered. It is well known that nuclein and nucleo-proteid greatly increase the excretion, and Horbaczewski's view that uric acid is derived from the nuclein of the white cells imparts additional interest to the question of the mode of production of the acid. Some support has been given to this theory by experiments recently recorded,[1] in which it has been shown that the variations in the number of leucocytes bore an inverse ratio to the variations in the excretion of uric acid, but it is difficult to understand why this nuclear origin should be restricted to the leucocytes. If the uric acid is partly derived from the metabolism of leucocytes, in all probability the other tissue cells (all of which contain nuclein) share in its production. If at the same time the phosphoric acid were shown to follow closely the uric acid excretion, the nuclear origin would be strengthened.

The relationship of the alloxur bases to uric acid is very close. They are built upon the same alloxan nucleus. They are produced on the decomposition of nuclein, and Horbaczewski[2] showed that spleen pulp was able to form uric acid from xanthein bases. The amount of alloxur bases excreted in the twenty-four hours is roughly about one-tenth of the uric acid, and they vary directly with the acid.

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[1] Bain and Edgecombe, '*Journ. Physiol.*, Cambridge and London, 1899, vol. xxiii.

[2] *Sitzungsb. d. k. Akad. d. Wissensch.*, Wien, 1891, Bd. ciii.

SPASMODIC ASTHMA.

By W. Blair Bell, M.B. (Lond.), M.R.C.S. (Eng.), L.R.C.P. (Lond.),
Wallasey.

Ever since ancient times there have been records showing us that asthma has always been a very present trouble, but, in spite of the abundance of clinical material, we have, since Sir John Floyer wrote in 1698, made very slow progress in our study of the condition.

Not only in the pathology is it that we have advanced so little, but also in the etiology; and I think that it is in a large measure owing to our conservatism to the older ideas regarding the etiology of asthma that our knowledge of its pathology and treatment remains still so unsatisfactory.

The subject has lately received more attention, but for the most part the contributions which have been made only tend to confirm my statement, following as they do in the well-beaten paths. I dare say this conservatism lies in the fact that most writers have held decided opinions and have written from one or other point of view, and that there has been no really circumspect and impartial analysis of the subject. Let me at once disarm suspicion, and state that it is not my object to supply this want in this short paper. I wish only to show briefly, if I can, what I consider to be the pathology of the condition, and at the same time to call attention to a glaring discrepancy in the *status* accorded to asthma, which, owing to the respect we have for tradition and the difficulty of shaking off bad habits, passes muster.

In a word, spasmodic asthma is not a *disease*, but merely a *symptom*.

Spasmodic asthma has been classified—is universally regarded, in fact—as a disease *per se*. Innumerable theories have been adduced to account for its existence, and it has come to be looked upon as a disease to be tolerated, perhaps "relieved" by some stray chance—by some happy selection of one of the innumerable drugs, the list of which is a lasting memorial to our admission of incompetency to scientifically undertake a cure.

I submit that this is the reason why asthma is such a bugbear to the patient and the profession, and that it is of very little permanent use to treat the symptom—asthma—only. And if this be so, surely it is just as unnecessary to describe various kinds of asthma as to describe "jaundice" or "headache" as diseases instead of symptoms.

First of all, let us consider the pathological condition which obtains during an attack of asthma, and then we will briefly consider the causation of the same.

It is impossible to enumerate here all the theories which have been advanced, but I think I may take it for granted, without further evidence, that asthma is generally admitted to be a neurosis—that it is brought about through the medium of the nervous system: but what then?

The view which has held the field longest is that which supposes that there is muscular contraction which lessens the calibre of the bronchioles (Young).

Although many physicians still adhere to this view, and although it is the one which is, I believe, usually taught—it is now dying a natural death.

Next, there is the "vaso-turgescence" theory—advocated by Clarke, Weber, Störch, and others—and this in my opinion comes nearest the truth.

For reasons which I shall give presently I have for several years held the view that asthma is caused by *active vaso-dilatation*—in short, that the pulmonary terminations of the vagus nerve produce, when irritated directly or reflexly, vaso-dilatation. By "active vaso-dilatation" I mean that there are in the pulmonary vessels vaso-dilator muscles, as opposed to vaso-constrictors, and that the vaso-dilatation is not mere relaxation of the vaso-constrictors, but an actual overcoming of the constrictors by the dilators which are supplied by the vagus. The existence of vaso-dilators and vaso-constrictors is, of course, a well-established fact. This vaso-dilatation causes obstruction of the small bronchioles, and produces the signs so well known to constitute the attack of asthma.

This I consider to be the state of affairs in *true* asthma; false asthma, such as occurs in sudden congestion in what has been known as "cardiac asthma," is a *passive* dilatation and not a neurosis at all, except in the rare cases mentioned below (Class II. (γ)).

"Renal asthma," too, may be true and false—the true is mentioned below; the false is produced as a result of the increased vascular tension, either directly or indirectly, through a failing heart.

Having thus stated what I believe to be the pathology of the condition, let me now endeavour to show how I have arrived at these conclusions, and in so doing I mean, of course, as regards the vaso-dilatation which I think exists during the attack.

My deductions are based on an analysis of the action of the various drugs which have been used to relieve the symptom, and in particular of the action of ergot, which I have found most beneficial in giving relief, while at the same time I believe it is a drug which has not been recognised in this capacity before.

To consider this drug first. It is well known that ergot produces contraction of the involuntary muscles of the arteries and uterus, and that these are constrictors in character.

Since ergot probably exerts the same effect on all the arterial vaso-constrictors of the body, it is reasonable to suppose that the constriction is the greater in those arteries which are least supported by surrounding tissues. Hence the small arteries in the lungs become markedly contracted under the influence of this drug. If this takes place, and the asthma is relieved, it must be owing to the vaso-constrictors being more powerfully stimulated by the drug and overcoming the vaso-dilators, stimulated by some of the exciting causes presently to be considered.

To take another large class of drugs which constitutes the basis of the routine treatment—I mean the anti-spasmodics.

The action of these drugs is to bring about the relief of the temporary spasm of the vaso-dilators, and in this class of drugs inhalation by chloroform and ether must be included.

Then, too, there are such methods for giving relief to the symptom as poultices, amyl-nitrite, nitro-glycerin, and the like, whereby the superficial blood vessels are dilated and the deeper vessels emptied. This calls into force the vaso-constrictors to reduce the size of the vessels in the lungs, in proportion to the amount of blood they contain.

In further support of the theory of vaso-dilatation, it may be pointed out that drugs which have marked physiological antipathies meet here to give relief—belladonna and opium, chloroform and ergot. It is because they, one way or another, act to relieve the vaso-dilator spasm; the chloroform, by removing this dilator spasm, allows the naturally more powerful constrictors to resume their normal tonic condition; the ergot, by actively stimulating the constrictors, overcomes the dilators—this of itself is convincing.

But we are faced with the question, How is it that what will relieve one man will not relieve another, especially when the specific drugs are used? The answer is, that in all cases of pure central asthma (Class II. (*b*), below) one is as easily relieved as another; but it is in those other reflex forms where, as I say, asthma is treated as a disease instead of as a symptom, and the cause is not treated, that failure is so frequent.

The drug which I have found of the greatest value in the relief of the symptom, under most circumstances, is ergot, in large doses (not, of course, neglecting to treat the primary cause); and this drug should be given to an adult in doses of 1 drm. to 2 drms. every half-hour until relief is obtained—I limit the total dose at 1 oz. in the above doses. I have been trying lately the derivatives of ergot—cornutin hydrochloride and ergotinin citrate—hypodermically, supplied in tabloid form by Messrs. Burroughs and Wellcome, but my results are not numerous enough to make any statement at present.

Now, to consider the causation of asthma: for the sake of clearness and brevity, I will endeavour to classify—

I. DIRECT CAUSES IN THE LUNGS.—(α) *Mechanical and toxic irritation* (*external*).—This may be caused by the inhalation of vapours, cold air, or dust (*i.e.* solid irritants). The result is usually immediate, and may disappear when the cause is removed.

(β) *Mechanical and toxic irritation* (*internal*).—By the elimination of irritant or toxic compounds from the blood in cases of gout, rheumatism, Bright's disease, intestinal intoxication, and uterine disturbances, especially pregnancy.

(γ) *Pathological conditions of the lungs.*—Tubercle, bronchitis (chronic or acute), broncho-pneumonia, etc., may all be accompanied by asthma.

II. INDIRECT CAUSES.—These indirect influences convey their impressions to the lungs through the branches of the vagus nerve, which has a pulmonary plexus. The peripheral branches have wide-spreading connections, and by far the most important in the causation of asthma is the gastric branch.

(α) *Gastric irritation.*—In a large proportion of the attacks of asthma in children here lies the cause. The reflex result takes place along the course of this gastric branch.

(β) *Naso-pharyngeal and aural.*—I need not repeat what can be found in any text-book of anatomy concerning the connections of the vagus with these regions, I must merely point out that polypi, adenoids, enlarged tonsils, catarrh, etc., are a frequent cause of asthma.

(γ) *Cardiac.*—It has been shown that "cardiac asthma" in a general way is not asthma at all, in the true sense of the word, but there *is* a true cardiac asthma which arises from irritation of the cardiac termination of the vagus, and produces a reflex irritation of the pulmonary plexus. It is very rare, and is the result of myocarditis and possibly pericarditis.

(δ) *Central.*—Central irritation is caused through the channels of the ordinary senses of touch, sight, hearing, smelling; or by mental impressions—fright, emotion, etc. Direct impulses are transmitted along the vagus to the lungs from the central nervous system.

It must not be forgotten that it is very common to see two or more classes of causes at work, and that, by treating the most obvious, disappointment naturally follows. Thus we see a patient with gouty asthma and nasal polypi. The latter are removed without much benefit. Cases illustrative of this double causation might easily be multiplied, and when a second cause is present it may be almost invariably taken as most likely that gout is one factor in the causation. Then, too, when once a person has had an attack of asthma, a variety of causes may bring on succeeding attacks. I mean by this, that if we take the case of a child who has had an attack of that peculiar form of bronchitis which is followed subsequently by attacks of asthma, but which has been recently referred to by Dr. Gee in the Lumleian Lectures, and which I have myself observed, we find that once the tendency to asthma, or the susceptibility of the vagus pulmonary plexus, be established, then some other cause—indigestion, or what not—may bring on an attack. I have not given actual cases to illustrate the causes above named, for want of space, but I have notes of cases which almost cover the whole ground, and I dare say that other observers can add to my classification.

In conclusion, may I say that I feel the time ought to have arrived long ago for asthma to be relegated to its proper position and importance in medicine, and this cannot be done until it is written down as a symptom of the diseases and conditions in whose train it follows.

[*Note.*—Since writing the above, a letter has appeared in the *Lancet*, London, May 20, 1899, from Dr. De Haviland Hall, *re* a discussion at the Laryngological Society of London, in which letter he points out the necessity of regarding asthma as a symptom.]

THE ETIOLOGY OF GRAVES'S DISEASE.[1]

By GODFREY CARTER, M.B., Ch.B. (Vict.), M.R.C.P.Ed., D.P.H. (Lond.), *Fellow of the Royal Institute of Public Health, Sheffield.*

I HAVE essayed to offer a few remarks on the subject of Graves's disease, as regards etiology; not because I venture to think that I can throw any fresh light upon this unsettled problem, but because the drawing into prominence of several possible causative factors, may perchance lead us to a nearer apprehension of the truth. I assume at the outset that the pathological lesions we have to account for in this disease may be considered as being connected with either—(1) An affection of the sympathetic nervous system; (2) a toxæmia from hyper- or altered secretion of the thyroid gland; or (3) the introduction into the system of a poison from without—analagous, say, to the poison which is believed, by some, to exist in "progressive pernicious anæmia" or in "Hodgkin's disease."

In order to elucidate matters, it may be as well to make a few observations, looking at the subject from each of the points of view presented by the above classification.

Considered, then, (1) as a lesion (a semi-inflammatory lesion, I presume) of the sympathetic nervous system, I grant that there is a very close likeness between Graves's disease and, say, such a picture as is presented by a person suffering from intense terror (a condition in which the somatic nervous system is, for the time being, almost paralysed, and in which the splanchnic is unmasked, and brought into full and evident play). In such a state, to use the words of Darwin and Sir Charles Bell, "the heart beats quickly and violently, so that it palpitates or knocks against the ribs; there is trembling of all the muscles of the body; the eyes start forward, and the uncovered and protruding eyeballs are fixed on the object of terror; the skin breaks out into a cold and clammy sweat, and the face and neck are flushed or pallid; the intestines are affected. Fright, intense grief, and other profound emotional disturbances, have long been recognised as immediate causes of the disease."

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[1] Read before the Sheffield Medical Society.

Ord and Mackenzie, in Allbutt's "System," remark that "we have no knowledge that the thyroid gland ordinarily becomes enlarged under the influence of fear, but it is evident that the other chief features of exophthalmic goitre temporarily result from such emotion. That occasionally Graves's disease, in a well-marked form, rapidly follows a sudden shock to the nervous system, indicates that all the symptoms may be produced in such a way."

Another argument in favour of the nervous causation is, that Graves's disease mainly affects women, and has even been known to occur in children, down to 2½ years of age. But upon this question of the heavier incidence of the disease upon the female sex, I shall have something to say further on.

Again, it may occur in several members of the same family. It has been observed in three successive generations. "Thus," says Ord, "it has been recorded that two sisters, their father, and two of his sisters, and his mother, were subjects of the malady. There is also the well-known case where a hysterical woman had ten children, of whom eight suffered from exophthalmic goitre, and one of the latter had three children thus affected."

I will now, for a few moments, direct attention to the second of the causes named, disease of the thyroid gland itself.

On this assumption, exophthalmic goitre is an auto-intoxication, due to the presence in the blood of an excessive quantity or altered quality of thyroid secretion; and it is only right to say that this view of the causation of disease is the one which holds the field at the present time.

The study of myxœdema has demonstrated most clearly what changes take place in the system, when thyroid secretion ceases to be elaborated. The patient shows a near approach to a vegetable existence. The administration of thyroid extract rapidly transforms the state; and those who have witnessed the effects of over-dosage, as I have done, will have observed vomiting, headache, and violent pains in the limbs, rapid pulse, and flushed skin—and, indeed, some degree of approach towards the symptoms of Graves's disease. The coarse and minute changes which are found in the thyroid, in exophthalmic goitre, are very marked and very interesting; there is enlargement in most cases, and this enlargement is not only a hyperplasia, but is associated with a true new formation of the secreting structure of the gland. In the words of Ord and Mackenzie, "on microscopic examination, the striking feature is the great increase of secreting structure. The secreting structure, moreover, is not merely increased, but it is much altered. The epithelium lining the vesicles is changed in form, from the cubical to the columnar type; there is increased proliferation also, so that the lining membrane becomes convoluted, and papillary projections into the spaces are commonly seen. The secretion contained in the vesicles is more mucous than the ordinary colloid, and stains much less deeply. Desquamation of the epithelium is not uncommon, so that the vesicles contain detached columnar cells. In addition to the changes in the vesicles, there is the production of a great number of newly formed tubular spaces, lined by a single layer of cubical epithelium." "These columns," as Greenfield points out, "closely resemble the tubules of a secretory gland. At a later period the gland may become firmer from the growth of fibrous tissue, and the proliferation changes may be obscured." "Edmunds has shown the great similarity between the gland tissue in exophthalmic goitre and that in an animal which has had a large portion of the thyroid removed by operation. From this he infers that the alteration in the thyroid gland in Graves's disease is of the nature of compensatory hypertrophy."

Greenfield has pointed out the resemblance in appearance of the goitre to a salivary gland. The goitre, according to him, "bears the same relation to a normal gland that the mammary gland during lactation bears to the quiescent gland."

Before considering the third and last view of the etiology of Graves's disease, I think it would be well to state briefly the objections which can be urged against either of the two theories, so far advanced.

As against the sympathetic nerve lesion hypothesis, it may be objected, in the words of Ord and Mackenzie, that "alterations in the sympathetic have been described by some pathologists, but it has not been shown that the changes are in any way peculiar to exophthalmic goitre. The sympathetic ganglia, it is true, in some cases, have been found diseased; but this is not a constant feature. Only some of the symptoms of exophthalmic goitre can be explained by affection of the sympathetic, and it is impossible to formulate a satisfactory theory of the malady on this basis. The derangement of the emotional nervous system will explain a good deal, but does not account for the enlargement and over-activity of the thyroid, nor for the persistence and hypertrophy of the thymus."

I believe this hypertrophy of the thymus to be a very constant factor in Graves's disease. Osler writes: "No constant changes have been found in exophthalmic goitre. Special attention has been paid to the condition of the sympathetic nervous system, but neither in the ganglia nor in the nerves are there any changes which can be regarded as constant and peculiar. The vascular and nervous features might be due to a lesion of the nervous system, but it is difficult, on any theory, to explain all the symptoms of the disease, and to bring into line the mental and vascular phenomena, the exophthalmos, and the goitre."

Now, as to the thyroid gland theory. Under what stimulus does the gland become enlarged? Not from excessive blood supply due to vasomotor changes, because the typical symptoms may be evident before the gland has had time to enlarge; it has been shown that the increased vascularity is principally superficial; and Dr. Greenfield observes that in cases examined by him there has been no increase in vascularity of the gland itself, but rather a diminution."

Coats says: "The condition of the thyroid gland is only part of the morbid phenomena, and shows no constant lesion after death. It has been found hypertrophied, or abnormally vascular or cystic, but also, in many cases, normal." He goes on to say: "The suggestion has been made that the disease is due to a hypertrophy of the thyroid, whose excessive secretion leads to the symptoms, but this view has not been confirmed."

Ord and Mackenzie state that "we think the facts of the case suggest that the thyroid condition is, at any rate, not the primary cause of the disease"; and again (a most important consideration), "If over-activity or over-secretion of a hypertrophied thyroid gland were the whole disease, it ought to be possible to produce it by the administration of large quantities of thyroid gland. No one has yet succeeded in causing exophthalmos in this way." "It is here," continue Drs. Ord and Mackenzie, "that the hypothesis that the disease is due to over-action of the thyroid gland fails. The supporters of this hypothesis have therefore fallen back on another surmise, namely, that not merely is the gland over-active, but that its secretion, besides being increased, is also perverted. Of this we have at present no absolute proof." "No explanation has yet been given of the relation of the persistent thymus to the disease."

It will be seen from the foregoing that the pathology of

Graves's disease, and consequently the etiology, is still the subject of uncertainty, and I now pass on to the third and last hypothesis suggested, namely, that of absorption of a toxin from without, or possibly a protozoon. The only reference I can find to this view is in Allbutt's "System," where there occurs the following brief note:—"Some have looked upon Graves's disease as an intoxication."

"Progressive pernicious anæmia" is now classed by such great pathologists as Coats, for instance, as being probably due to the absorption of an intestinal toxin, and Hodgkin's disease is classified amongst the "infective tumours," yet the actual infective agent has never been demonstrated.

Leukæmia is linked with the last named in causation; and note some of the secondary changes found in these diseases.

In addition to involvement of the spleen (which under the present line of argument would be held as analogous to the enlargement of the thyroid in Graves's disease), there are enlargements of lymphatic glands of the liver, of the closed follicles of the intestine, and round-celled infiltration of the kidneys. Hodgkin's disease is spoken of as "an infective disease, having some analogies with tuberculosis, but limiting itself much more to the lymphatic system" (Coats). In it metastatic new formations are found in many organs, and possessing the structure of lymphadenomata.

Coming nearer, we find *simple* goitre now spoken of by Coats and others as "ascribed to an unknown miasm." Whitelegge, in his work on "Hygiene," says "that the agency of some organic material is necessary." Prof. Grasset has communicated the results of a study, extending over ten years, of persons suffering from goitre in one department of France alone. In that region there are places where the disease is endemic, and others where it is entirely unknown.

The affection is observed to develop after menstruation, childbirth, emotional disturbance, or a chill; often it appears consecutively to a slight fever or an attack of gastritis. From these facts Grasset concludes that goitre is a general disease with a dominant local symptom, to wit, the enlargement of the thyroid gland. This feature of the affection he regards as analogous to the enlargement of the spleen characteristic of malaria. He points out that both diseases have a special geographical distribution, both affect a gland with internal secretion, and both end in cachexia. In the blood of eight patients suffering from recent goitre (ten to fifteen days), Grasset found special parasitic elements. He describes these as spherical bodies, larger than blood corpuscles, having no nucleus and containing red pigment. Each has a free flagellum four times as long as a red blood corpuscle. There are also segmented bodies, agglomerated or separate; and, lastly, there is a body of irregular contour containing red pigment but no nucleus.

These elements recall the hæmatozoa of Laveran, from which, however, they differ by the presence of the pigment, and the absence of crescentic bodies. None of the goitrous patients whose blood was examined was the subject of malaria, or has since become affected with that disease. All this is a great change from the teaching of a little while ago, when goitre was described as being due to an excess of calcic and magnesic salts, iron pyrites, etc., in drinking water. And I am by no means certain that simple goitre is the simple local disorder it is generally supposed to be. Coats says: "The lesion is primarily an increase of the normal gland. In other cases the new formed tissue is discontinuous, occurring in the form of isolable tumours, in the midst of the gland. To this form the name of adenoma is given. In both forms the tissue is liable to colloid degeneration. A few cases are on record in which secondary tumours developed, chiefly in the bones. In a case observed by Coats there were several such tumours in the bones of the skull, which presented the typical structure of the thyroid gland."

Exophthalmic goitre shows some very wide circles of diffusion, which suggest its being a general disease. Urticaria is a prominent symptom in acute cases, and so sometimes is mania; then epistaxis, œdema of conjunctivæ, fleeting œdemas, or even general anasarca with effusion into serous cavities, diplopia on lateral movement of the eyes, pulmonary, intestinal, meningeal, and cerebral hæmorrhages have been recorded by Trousseau. Anæmia is a marked feature, and points to some grave blood deterioration. Often there is cough and dyspnœa. "Acetonæmia has been observed" by Dreschfeld "in connection with the attacks of persistent vomiting." "With vomiting also may be intense prostration and restlessness, and the dyspnœa or air hunger observed in diabetic coma" (Allbutt). "Such latter symptoms generally forebode a fatal issue." Intermittent albuminuria has been noted by Begbie and others. Then headache, cramps, and feebleness of the lower extremities, almost amounting to paraplegia, have been noted in some aggravated cases of the disease. If we add to these occasional manifestations, the history of some of the very acute cases of Graves's disease which have been recorded, I think it must be borne in upon all of us, that it is at least possible that we have to do with an infective disorder of external origin. Osler says: "Two rapidly fatal cases occurred at the Philadelphia Hospital, one of which had marked cerebral symptoms. A patient of Mr. Lloyd's, a woman, æt. 39, who had been considered perfectly healthy, was suddenly seized with intense vomiting and diarrhœa, rapid action of the heart, and great throbbing of the arteries. The eyes were prominent and staring, and the thyroid gland was found much enlarged and soft. The gastro-intestinal symptoms continued, the pulse became more rapid, the vomiting was incessant, and the patient died on the third day of the illness." This at least is a picture of acute poisoning, and it was a case of Graves's disease. As I have drawn an endemic disease like simple goitre somewhat pointedly into my remarks, and have, moreover, insisted upon its organic miasmatic origin, it may be pertinently asked, Do we see any parallelism between the two? "Is exophthalmic goitre also predominant in certain localities?" Yes, it certainly is; although the disease, being a comparatively rare one, is not so easily dealt with for purposes of localisation geographically. Ord and Mackenzie say, "It appears that some localities furnish more cases than others." Thus certain parts of Kent, Surrey, Wiltshire, and the Thames valley have produced a relatively large proportion of cases under our observation (the writers are London men). But they add, "In districts where ordinary goitre prevails, the exophthalmic form is also met with." If this be so, we should naturally expect that in the northern midlands it would be not infrequent. Sheffield borders close upon Derbyshire, and is a centre towards which obstinate medical cases from that county would tend, in some measure, to gravitate for advice.

I therefore asked some of my colleagues if they found the disease coming up for treatment frequently here. The answer was, "Yes, frequently." Personally, I was first set thinking about this matter by observing, some years ago, that in a certain valley in the West Riding, where the inhabitants on one side of the river drank water from hills to the south, and those on the other side water from uplands to the north, that the latter suffered a good deal from goitre, while the former escaped. This was very noticeable, and what was more, from the affected side (as I will call it) came several cases to me of Graves's disease.

I believe it is by no means an unknown thing for a person to begin with simple endemic goitre, to persist with it for a considerable time, and then to drift into the exophthalmic form.

I have only one more point to touch upon.

A strong argument in favour of the sympathetic nervous causation of exophthalmic goitre, is its undoubted greater frequency in women. If due to an external agency infecting the system, why should not men suffer equally? But why do women show by far the greater incidence of cases of simple goitre, which all agree results from an imbibed miasm? Pugin Thornton[1] notes this and offers an explanation.

He says: "Women in this country are much more liable to suffer from bronchocele than men;" and he adds, "Perhaps it is on account of their being more frequently water-drinkers, for in India it has been noticed that both sexes suffer alike." Certainly in Britain we see more cases of Graves's disease in women than in men. Ord and Mackenzie put down the proportion as 5 to 1. But in France, Charcot speaks of the disease as being only a

[1] Quain's "Dictionary of Medicine."

little less frequent in men than in women, and in Germany Eulenburg gives the proportion "as one male to two females." I should be extremely interested to hear if any partiality for sex has been observed in those rare cases where exophthalmic goitre has been found in children.

I have myself only had three cases of Graves's disease altogether of late years. Two were in women, one in a man. And I may add that, in this latter, which was a very severe case, there never was, nor is now, the slightest observable enlargement of the thyroid gland.

I would not have it to be inferred for one moment, that I am writing in the capacity of an exponent of some but slightly hitherto considered view of the causation of Graves's disease. I do not wish and I do not feel competent to do that. I have had no special facilities for investigation.

No doubt all the hypotheses touched upon have been well and fully considered by those most competent to judge.

All have hitherto been found wanting; and so remain. I have endeavoured to state impartially and fairly the different arguments pro and con, according to whichever view I have been discussing. The object of my remarks is to draw attention somewhat from the stereotyped acceptation of views as regards the etiology of Graves's disease, which have found their way into all text-books, but which have only been tentatively accepted by the profession, and to ask your readers to keep open minds upon the aspects of this problem, and consider if there is any likelihood of truth in the third and less accepted view as to the causation of Graves's disease which I have placed somewhat in detail before them.

CLINICAL RECORDS.

AN UNUSUAL CASE OF ASCITES.

By John Dougall, M.D., F.F.P.S.G., *Professor of Materia Medica, St. Mungo's College; Physician and Lecturer on Clinical Medicine, Royal Infirmary, Glasgow.*

Case.—W. W., æt. 30, sett maker, *i.e.* dresser of stones for street causewaying, was admitted to Ward 1 of Glasgow Royal Infirmary on 14th October 1898, complaining of pain and swelling of his abdomen of six months' duration.

Family history is unimportant. His father died of enteric fever, æt. 58; his mother is alive and well, æt. 51. Patient is the eldest of a family of six—three brothers and two sisters, all living and healthy. He is ruddy featured, fairly well nourished, and has no appearance of one suffering from any organic disease. He had enteric fever when 8 years old, and frequent bilious attacks during the following ten years.

At the age of 20 he went to America, and in a year after was ill for seven weeks with remittent fever. During the seventh week secondary symptoms appeared, the cause of which was contracted before the fever, and for these he took appropriate medicine nearly two years. During the subsequent six years he was in fair health, then had frequent fits of sickness and vomiting. He returned to Scotland, and for the past seven months has been treated for enlarged liver, but is become worse from vomiting, abdominal swelling, and pain. He was always regular and temperate in his habits. When in America he drank only lager beer, and since he came home has taken whisky, but not by any means to excess. Has suffered frequently from hæmorrhoids; never had hæmatemesis, melæna, nor jaundice, nor is he jaundiced now. He has pain in the abdomen after food; the appetite is fair; bowels are irregular but inclined to be costive; tongue is foul; the saliva bitter; he suffers from thirst and general weakness; his hands and feet keep cold.

Physical examination.—The cardiac dulness and sounds are normal. Percussion and auscultation of the lungs are normal, except a small dull area with slight diminution of vocal resonance and fremitus around the angle of the left scapula, probably caused by some thickening of the pleura from pleurisy. Hepatic dulness is increased, measuring in the nipple line 7 in., and transversely from the axillary line 9 in. The circumference of the abdomen at the umbilicus is 38 in., and the peritoneal cavity is much distended with fluid. The spleen is greatly enlarged, but its exact size cannot be accurately determined from the ascites present. The feet pit on pressure. Pulse 64, moderate tension. Temperature 97°·2, and was nearly always from half a degree to a degree and a half subnormal; in a very few instances was it above normal, and that trifling. Specific gravity of urine, 1·20; scanty, acid, clear, albuminous, contains a mere trace of bile, but no lithates, sugar, nor blood. Stools drab-coloured.

During the ensuing five months patient had various cholagogues, diuretics, and diaphoretics, with light diet, chiefly milk, as his condition seemed to indicate, and besides had his abdomen tapped thirteen times. As it now was obvious that the medicines were doing him no good, they were stopped altogether, and during his remaining five months' stay in the hospital the sole medicinal treatment was his drinking largely of pure and aerated water, and walking till feeling tired twice or thrice daily, in the Infirmary recreation grounds. During nine months of patient's residence in the hospital, his bodily conditions, as already noticed, were practically unchanged, except that diarrhœa was sometimes so copious that astringents had to be given. Ascites, however, was the prominent and most urgent symptom, and paracentesis abdominis the sole source of relief to its effects. By removing the pressure of the fluid on the diaphragm, dyspnœa was relieved, pressure on the kidneys lessened, and albuminuria diminished, while the urine was often increased by several ounces daily for some days after each tapping. The portal circulation must have been absolutely blocked in this patient's liver, judging from his general symptoms, the number of operations on him, the short intervals between these, and the quantities of fluid drained off.

The following table shows the date of each tapping and the amounts of fluid obtained:—

1898.		1899.	
Oct. 21,	112 oz.	April 6,	236 oz.
Nov. 2,	182 ,,	,, 14,	346 ,,
Dec. 3,	163 ,,	,, 22,	350 ,,
,, 17,	186 ,,	May 2,	346 ,,
,, 23,	232 ,,	,, 9,	340 ,,
1899.		,, 18,	342 ,,
Jan. 16,	236 ,,	,, 24,	322 ,,
,, 27,	280 ,,	,, 31,	324 ,,
Feb. 14,	344 ,,	June 7,	290 ,,
,, 21,	320 ,,	,, 15,	283 ,,
Mar. 1,	380 ,,	,, 23,	285 ,,
,, 11,	372 ,,	,, 30,	286 ,,
,, 20,	340 ,,	July 10,	163 ,,
,, 29,	308 ,,	Total	7468 ,,

or 46 gals. 5 pts. 8 oz.

The specific gravity of the fluid was never higher than 1·10, nor lower than 1·5. It was of the usual pale straw tint, and alkaline. Murchison and some other writers give the specific gravity of the ascitic fluid in hepatic affections at from 1·12 to 1·16, but it is highly probable that the large quantity of water which the patient ultimately drank lowered the specific gravity of the fluid tapped from him.

From the foregoing it will be obvious that the prognosis in this case was most unfavourable, and I often pointed him out as a physiological conundrum—a person fairly healthy on the whole, and with no liver—he had no jaundice; his fæces were drab and clay-coloured; his urine was clear, although it sometimes gave the merest response to the well-known nitric acid test. It could not, therefore, be gall stones, catarrh of the common bile duct, a tumour pressing on the bile canals, or other mechanical block of these, otherwise jaundice and biluria would have been present. At first it was thought to be hepatic cirrhosis, but such cases are always fatal sooner or later, while it is impossible that a cirrhotic liver can ever be restored to its former healthy state, so as to perform its normal functions, from the conversion of its greater part into fibrous tissue. The reverse was the case here; patient not only lived, but after the twenty-sixth tapping and the withdrawal of 46 gals. of fluid from his abdomen, and being eight months under treatment, the ascites ceased, and his stools became markedly bilious, his urine still being clear. This continued during his other one month's stay in the Infirmary, when he left apparently well, except a trace of albumin in his urine.

REMARKS.—As regards the disease which caused the foregoing symptoms, I think it was "simple induration of the liver." In such cases this is the view held by Murchison.[1] He says, "There is a clear history of constitutional specific disease; absence of any history of spirit drinking; and in many cases a history of ague or malarious remittent fever." These three points are applicable to the patient. He had the two diseases mentioned, and was not a spirit drinker.

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[1] "Diseases of the Liver."

It is interesting to consider how so large a gland as the liver, after its function being in abeyance for nine months from induration, should again resume work. One would rather be inclined to think that the induration would remain, and atrophy ensue. Although the quantity of fluid taken from the abdomen was large, there are many instances recorded of much greater quantities being tapped in hepatic disease. The part where the cannula and trocar were to pierce was always anæsthetised by pressing against it for five minutes a smooth face of ice covered with salt. In only one of the tappings did fluid continue to flow, or rather to freely ooze from the orifice made by the cannula and trocar, after the peritoneal cavity was emptied and the orifice dressed. This fluid often comes, as I have seen before, from the cellular tissue in the wall of the short sinus of the puncture, and is œdematous, not ascitic. It is only apt to ooze where there is also tumidity, with pitting on pressure, more or less on the trunk and lower limbs, and usually ceases in two or three days, leaving the affected parts limp and flaccid.

AN OPERATION FOR THE RADICAL CURE FOR HERNIA.

By Charles A. Sturrock, M.A., M.B., F.R.C.S.Ed., *Dunfermline.*

Few regions of the body have proved so attractive to the venturesome surgeon as the inguinal canal. The number of operations for the radical cure of hernia is already a large one, and it would seem almost impossible to devise an operation which had not, in some detail at least, been already carried out.

It is therefore with considerable hesitation that I suggest an operation which, in my opinion, fulfils the essential requirements of a radical operation without introducing elements of a controversial nature.

The steps of the operation are as follows:—A short incision is made, the centre of which lies immediately over the external abdominal ring; the subjacent structures are then divided until the sac of the hernia is exposed, which is then isolated and separated from its attachments as far as the internal abdominal ring; care being taken to avoid division of any of the muscles which form the anterior boundary of the inguinal canal. An incision is now made into the most dependent part of the sac, the forefinger of the left hand, or a pair of forceps, is passed through this incision into the abdominal cavity, the tip of the finger being placed at a point 1 in. above the spine of the pubes and midway between the internal and external borders of the rectus abdominalis. A second incision—which need only be a short one—is made over this point, dividing all structures until the peritoneal cavity is opened. A pair of forceps is then introduced into this opening and passed into the sac of the hernia, which it grasps where the incision into it was made. The sac of the hernia is then pulled out through the incision in the rectus, where it may be temporarily clamped. The aperture through which the hernia escaped is now closed, and for this purpose I think a Macewen's hernia needle is the best instrument, care of course being taken to leave sufficient room for the cord and spermatic vessels. There can be no doubt that œdema of the testicle, which so often supervenes after herniotomy, is due to too perfect closure of the hernial aperture, and for several reasons this should be avoided.

The redundant portion of the sac is now ligatured and excised, and a stitch is inserted into the rectus which includes the stump of the sac; and another one, which includes the fascia of the rectus, closes the incision in the skin.

The advantages which I claim for this operation are—(1) No pad or dimple of the peritoneum is left in the vicinity of the internal abdominal ring, either of which is probably a most important factor in facilitating the recurrence of a hernia; (2) there is no extensive and extravagant division of the musculature of the abdominal wall, which cannot but seriously interfere with its integrity; (3) the cord is left in its normal situation; (4) the weak point of the abdominal wall is removed from the inguinal region to a small area behind the rectus abdominis—a region in which ventral hernia is practically unknown. Ventral hernia, I admit, is not infrequent in the linea alba, but I have myself never seen a case of hernia protruding through the rectus itself. By the inversion of the sac of the hernia no extraperitoneal element is introduced into the peritoneal cavity, and this point essentially distinguishes this operation from Kocher's latest modification of herniotomy.

The second incision may by some be regarded as enough to condemn the operation; but if it is carried out in the way I suggest, it can be rapidly made; it scarcely, if at all, interferes with the integrity of the abdominal wall; and the increased risk to the patient must be a very slight one.

I have recently performed the operation which I have just described, and though the immediate result leaves nothing to be desired, sufficient time has not yet elapsed since the operation to state its effect upon the prevention of recurrence.

It is obvious that the principles of this operation may be carried out in regions other than the inguinal: thus in the case of a femoral hernia, the second incision would be made at the same point as in an inguinal hernia; in the case of an umbilical hernia, the second incision would be made to the left of the middle line, through which the sac, or what was left of it after excision, would be drawn, care being taken to avoid the anastomosis between the deep epigastric and internal mammary arteries.

Since writing the above, my attention has been directed to an article, with which I was unacquainted, by Professor Kocher.[1] In it, Professor Kocher advocates that a second incision be made 2 cms. external to the internal abdominal ring, which shall open the peritoneal cavity, and through which the sac of the hernia is drawn. It seems to me that an incision in this situation has disadvantages which the incision through the rectus lacks—these I have already alluded to.

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[1] *Centralbl. f. Chir.*, Leipzig, 1897, No. 19.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

Vaccination: its Natural History and Pathology. By S. MONCKTON COPEMAN, M.A., M.D. (Cantab.), M.R.C.P. (Lond.). London: Macmillan & Co. Ltd.

THIS volume is a publication in book form of the Milroy Lectures, delivered by Dr. Copeman in 1898. Its merits are mainly twofold. In the first place, it presents in a succinct and well-arranged manner our present knowledge of vaccination in its scientific aspect; and, secondly, it gives a full account of the author's own work on the glycerination of lymph, and of the benefits of the procedure. It does not concern itself, unless incidentally, with the legal aspects of the subject—its scope is, in fact, well defined by the terms "natural history" and "pathology."

The opening chapters are occupied by a well-written and historical survey, from which the author passes naturally to a consideration of the much-contested question as to the relation of vaccinia to variola. The experimental evidence is fully given and carefully weighed, and the conclusion (with which we agree) that both are due to the same virus, modified in the former by transmission through the bovine species, is stated not as absolutely proved, but as one which must be accepted as the only explanation of the established facts. Dr. Copeman's experiments on monkeys, described in a later chapter, are of importance in this connection. From them he concludes that humanised lymph, calf lymph, and variolous lymph all produce practically the same effects when tested on these animals. They thus supply a means of applying the "variolous test." One point to which the upholders of the theory of duality might take exception is the use of the term "sport" as applicable to the recovery of the variolous character, on inoculating from the calf to man (*i.e.*, if such occurred). They might with reason say that when a calf is variolated, and the modified disease transmitted to other calves, then on reinoculating the human subject, and on passing from subject to subject, some recovery of the original character might naturally be expected.

In a chapter on the histology of the vaccine vesicle, the changes are minutely described, among the more important points being the description of a characteristic diplobacillus (referred to below) in the tissues, and the statement that Guarnieri's supposed parasites are derivatives of the nucleolar chromatin, which from the twenty-fourth hour onwards increases in amount, and is ultimately extruded in the cytoplasm. We would, however, question the statement—though one of minor importance—that by the continued emigration of leucocytes the central zone necroses more and more (p. 80).

The account of the bacteriology of the subject embraces a very full historical review—so full, in fact, that it might have been with advantage condensed, as so much deals with merely accidental organisms. The greatest amount of interest attaches to the bacillus described independently by Klein and by the author. It is unfortunate, though of course unavoidable, that Dr. Copeman's observations are at such a stage as to afford strong grounds in support of the causal relationship of this organism to the disease, while still leaving final proof awanting. Doubtless before long the matter will be definitely settled. The properties of the serum of vaccinated or variolated animals are discussed under the heading "Antitoxin"—but is that use of this term justifiable, seeing that the antagonising property has as yet been tested only against the living virus?

Probably the most important part of the book is that dealing with glycerinated lymph. The author's own work in connection with this subject, the method of preparation of the lymph, and the benefits of its use, are definitely set forth. The procedure has now been fully justified by the scientific work of various independent observers, as well as by the results of its practical application. The subject is therefore one with which members of the profession should be completely familiar, and if for no other reason than this, the book may be strongly recommended. We need only add that the work abounds in interesting matter, and is written in a most readable style; it is moreover reliable.

Robert Muir.

An Introduction to the Study of Materia Medica. By Henry G. Greenish, F.I.C., F.L.S. With 213 Illustrations. London: J. & A. Churchill.

This book has been written by a well-known teacher of the subject, one thoroughly conversant with the difficulties of the student. To those, therefore, interested in the subject, to teachers and students alike, the work will prove of considerable value as a practical guide to the study of the more important crude drugs of vegetable and animal origin. The author emphasises the fact, and with good reason, that the study is essentially a practical one, and it is with the object of assisting the student in obtaining a practical knowledge of his work that the book is written.

The arrangement adopted is a simple one. The organised drugs are distinguished from the unorganised, the latter being mere vegetable products with no definite structure. The organised drugs are arranged in "sections according to the organs they represent, and the members of each of the sections thus formed have been grouped in their natural orders. The unorganised drugs have been divided into groups, depending principally upon differences in their composition or mode of preparation." The individual drugs are dealt with at length, as regards their source, description, constituents, substitutions, and uses. What receives most attention is the description of the drug itself, and to assist the student the text is fully illustrated. The illustrations, some of which are reproductions of photographs, represent the drug itself or the plant from which it is derived, and in all cases the distinctive features are easily recognised. It should be noted with regard to the minute anatomy of the drugs, as studied with the microscope, that the author has purposely avoided dealing with this part of the subject in any detail.

While estimating such a study of the drugs as of paramount importance, especially in assisting the pharmacist in detecting substitutions, the author wisely leaves that for the more advanced student, and for treatment in a subsequent volume. Where, however, distinctive characters of the crude drugs can be recognised by the help of a good pocket lens, these are discussed and diagrams given. Occasionally only are these supplemented by diagrams of sections, as seen by the low power of the microscope, as for example in the case of the fruits of the *Umbelliferae*. The description of each drug usually finishes with a summary of the more important features by which the drug may be recognised, and a short reference to those drugs with which it should be compared, so as to prevent confusion.

This descriptive part, with the illustrations, forms the chief part of the work.

With regard to the active principles of the drugs under consideration, these are discussed as far as is essential, but not at great length, because, as a rule, the student cannot pursue this part of the subject in a practical fashion. He is supposed to have a sufficient knowledge of chemistry to enable him to understand the character of the chief active principles of the drug, but practical experience has shown that the student of pharmacy is not as a rule well versed in this knowledge, so that this work would be much enhanced if in an appendix a short account of the chief general characters of the more important active principles, such as the alkaloids, glucosides, etc., was given.

It will be noted, further, that there is no reference to preparations, official or non-official. The scope of the book does not permit of these being dealt with, and it may be remarked that the student, especially the medical student, while understanding the nature of preparations made from such drugs, would be wise at the outset to postpone burdening his memory with numerous preparations and their doses before he is thoroughly acquainted with the drugs themselves.

After thus considering the scope, as well as the excellent character of the book, and the manner of its preparation and publication, we have no hesitation in strongly recommending it for perusal by both students and teachers.

R. BARCLAY NESS.

Manual of Human Physiology. By LEONARD HILL, M.B. London: Edward Arnold. 1899.

Elementary Physiology. By BENJAMIN MOORE, M.A. London: Longmans, Green, and Co. 1899.

THERE has been up to the present a great lack of good modern elementary text-books on physiology. While we can boast of possessing some of the best books in any language on elementary physics, written by masters of their subject, we can only point to one or two good elementary manuals on physiology, and these apt either to be too technical for the general reader, or so much out of date as to be for many purposes of very doubtful value. The small book which has just been brought out by Leonard Hill is intended for "students training to qualify as teachers, nurses undergoing hospital training, and for the higher classes of schools and polytechnics." It is written in a distinctly different style from Moore's text-book, although both authors have tried as far as possible to avoid the use of technical terms when others could be employed. The former book is very practical in character, instructions for simple experiments being given in a clear and bright fashion, and the reader carried on from one subject to another until, if he has made good use of his opportunities, at the close of his study he is left with a good general idea of the structure and functions of the different parts of the animal body.

The other smaller manual is not so practical nor perhaps so brightly written; but the author has made the most of the space at his disposal, with the result that he has produced a most excellent elementary textbook.

There is a tendency, especially noticeable in Hill's Manual, to take for granted that the reader has no knowledge even of elementary physics. Now, students training to become teachers, and boys in the higher classes at schools or at polytechnical institutes, do not require to be told that "a gas is not sticky to feel, nor tough, nor hard, etc."; and such a definition as that given of diffusion, "the power of molecules to slip past each other," is hardly of any value. But when one comes to the more essentially physiological parts, and perhaps especially the chapters on the circulation of the blood, one can only express praise with regard to the way in which the subjects have been treated. There is a peculiar tendency on the part of the author of the first mentioned text-book to refer to the *blue* colour of venous blood and "blue reduced hæmoglobin." In both books, the sections on circulation, respiration, digestion, nervous system, and the senses, are clearly written. Moore, curiously enough, does not mention the valvular factor in the production of the first heart sound, while he refers to the rush of blood from the ventricles into the arteries as participating in its production. He also groups together all conditions in which glycosuria occurs, regarding them as due to disturbances in the glycogenic function of the liver cells. Now, one cannot group under the same heading, phloridzin diabetes, glycosuria after removal of the pancreas, and puncture of the floor of the fourth ventricle. In all you may have the hepatic cells secondarily affected, but the primary affection is, in all probability, different in each case.

Both books can be most heartily recommended to any student who wishes to obtain a good elementary text-book of human physiology.

T. H. MILROY.

The Principles of Bacteriology. By Dr. FERDINAND HUEPPE, Professor of Hygiene in the University of Prague. Authorised Translation from the German by Dr. E. O. JORDAN. London: Paul, Trench, Trübner & Co., Ltd. 1899.

IN this book we have something more than a mere text-book of bacteriology, in which the methods of the art are described, and the more important parts of the subject are set forth to meet the practical needs of the physician and the laboratory investigator. As the author states, many such works exist, in which what he terms the "natural history" side of the question has been kept in the foreground, while the scientific side has been confined almost exclusively to the section dealing with immunity. In the "Principles of Bacteriology," on the other hand, the author devotes himself exclusively to the problems of bacteriology, and to the facts and theories which bear upon these. Thus, in his opening chapter, he deals with the structure of bacteria, and with the various systems of classification which have been suggested, and the principles on which they are based. It will no doubt surprise most readers of the ordinary text-books to learn that the so-called tubercle bacillus is probably only a pleomorphic mould. In any case, whether he agrees with the proposed nomenclature or not, he is supplied with the reasons for and against the various systems, and can in the future classify the organisms he may separate in his work on a more or less rational basis.

In the next chapter, which deals with the vital phenomena of bacteria, we have given in a very succinct form all the important facts which have been ascertained regarding the physiology of micro-organisms.

In the later chapters, on the cure of infectious disease and immunity, we have a contribution which will be read with the closest interest by all who take an interest in medical science, since we have discussed in the most comprehensive manner the nature of disease and the theory of natural and acquired immunity.

We feel certain that this book will meet a want which has long been felt by bacteriologists, who find in their text-books merely a recital of the bare facts of the science, and have to resort to the scattered literature of original papers for a discussion or even description of the fundamental principles of the science.

In conclusion, it may be stated that the translator has reproduced the author's ideas with clearness and fidelity.

G. E. Cartwright Wood.

Pathological Technique: A Manual for the Pathological Laboratory. By Frank Burr Mallory, A.M., M.D., and James Homes Wright, A.M., M.D. London: The Rebman Publishing Co.

The appearance in increasing numbers of such works as the present is a satisfactory sign, in so far as it indicates the growing importance of the application of scientific methods to practical medicine. As compared with existing works, this volume has its chief merit in the great extent of ground which it covers. The leading idea is "to present, as far as possible, a consecutive statement of the methods employed in solving the problems that arise" in connection with autopsies. It thus treats of—(1) The methods of post-mortem examinations, (2) bacteriological methods, and (3) histological methods. In addition, the special methods of clinical bacteriology and pathology are also given. To do all this within a limited space is no small task, and the authors are on the whole to be congratulated, as regards both the selection of methods and the manner in which they are described.

The first part dealing with post-mortem examinations is concisely and sensibly written, and contains many important practical hints. We, however, think that the incisions recommended in opening the heart are unnecessarily extensive, especially with a view to museum specimens. The part relating to bacteriology includes, in addition to the usual methods, etc., a short description of the important pathogenic organisms, well illustrated by photo-micrographs, chiefly reproduced from standard authorities. The account of histological methods is probably the most important part of the book—certainly the most useful for purposes of reference—and embraces practically all those which are in common use or possess special advantages. The formulæ of the various fluids, etc., are first given, and their mode of use is afterwards described in connection with the particular tissues to which they should be applied—an arrangement which at first sight appears somewhat inconvenient, but is really the most satisfactory one. Though in such a work it is impossible to give everything, there are certain subjects to which we would have expected reference to be made—for example, forms of incubators, the rocking microtome, freezing by ice and salt, the "water method" of fixing paraffin sections to the slide, the "wet methods" of fixing sections to the slide, the "wet methods" of fixing film preparations, etc. And we have obtained the impression that methods devised in this country are not so well known to the authors as those of continental origin, though some of the former are superior. In connection with serum diagnosis, greater details, especially regarding the degree of dilution, would be desirable.

The book is manifestly the work of those having intimate practical knowledge of pathological technique, and we can with confidence recommend it to those who desire to have in one volume a reliable guide in the departments mentioned. ROBERT MUIR.

Anæmia and some of the Diseases of the Blood-forming Organs and Ductless Glands. By BYROM BRAMWELL, M.D., F.R.C.P.Ed., F.R.S.E. Edinburgh: Oliver & Boyd. 1899.

UNDER the above title Dr. Byrom Bramwell has included chlorosis, pernicious anæmia, leucocythæmia, Hodgkin's disease, Addison's disease, myxœdema, exophthalmic goitre, and acromegaly. In each case a general systematic description of the disease has been given in detail, the rarer conditions having appended to them clinical histories of all the cases which have come under the author's notice, these including forty-five cases of pernicious anæmia and no less than forty of myxœdema and sporadic cretinism. From this it will be seen that the author has been able to draw largely on his own experience in verifying his clinical descriptions, which are accordingly very complete and accurate in detail. A special feature of each article is the careful and elaborate way in which etiology has been treated, the opinions and investigations of different authors being fully and impartially discussed, without having the effect, however, of throwing much further light on the numerous vexed questions as to the essential nature of certain of these diseases. When considering the treatment to be followed, Dr. Bramwell confines himself closely, if not strictly, to his own personal experience and methods, emphasising those which have proved most serviceable in his hands, but discussing also those which wholly or partially failed. This method has the merit of being practical, with the drawback of being a little one-sided.

Very great attention has been paid to diagnosis and differential diagnosis, perhaps rather too much, as, for instance, under Addison's disease and Hodgkin's disease, where other conditions have been considered and differentiated, which could scarcely be mistaken for these diseases by anyone possessing even slight clinical experience.

The author has compiled numerous tables, in which information regarding certain symptoms, or the results of treatment by certain drugs, are summarised, so as to be visible at a glance.

There is an opening chapter on the general features of anæmia, in which the causes, symptoms, and classification are very fully considered, along with certain general questions regarding the physiology of the blood. Such is a mere outline of the scope of a work which presents to us, in complete and careful detail, an account and summary of our present knowledge of the important diseases of which it treats.

RALPH STOCKMAN.

Chirurgie de l'Estomac. Par F. TERRIER, Professor à la Faculté de Médecine, Chirurgien de l'hôpital Bichat; et H. HARTMAUN, Professor agrégé à la Faculté, Chirurgien des hôpitaux. Paris: G. Steinheil. 1899.

THIS is a work which appears at a time when a really exhaustive account of the progress of the surgery of the stomach, well illustrated and written with authority, is a great desideratum. We can say of this book of MM. Terrier and Hartmaun, that it to a very great extent supplies this want. There is scarcely a point of importance in the surgery of the stomach that has been omitted, and every operative procedure and every detail in which one method of operation differs from another is fully and clearly described. If, where so much is excellent, it is permissible to find a fault, we would say that the authors do not with sufficient clearness indicate in many places their own preference for the different operative procedures, but, having given the reader the pros and cons, leave it to him to choose the method he may deem best. We have a right from a surgeon of M. Terrier's eminence to know definitely what operative measures he considers best in each case. With regard to the incision in gastrostomy, the authors hold that too much importance has been attached to theoretical points of no great moment, "the essential thing is to draw into the wound a portion of the stomach in the neighbourhood of the cardiac end of the viscus, and to make the fistula here." "The incision in the abdominal wall is a matter of minor importance." On the question of the advisabilility of anæsthetising patients who are exhausted by starvation prior to the operation of gastrostomy, the authors advise the administration of chloroform, and point out that a minimal amount of chloroform suffices in these patients to maintain the anæsthesia. They condemn in such cases the employment of cocaine anæsthesia. In the operation of gastro-enterostomy we are glad to see that our authors speak well of Murphy's button. They think that the objections frequently urged against its employment are almost entirely theoretical, and that clinical experience has proved them to be so, and they prefer the Murphy button to all other mechanical contrivances. In the account of the operation of pylorectomy we are told to cut through the wall of the stomach 3 cms. (1⅕ in.) from the margin of the disease, to employ the continuous suture, and to make use of forceps or clamps in place of digital compression of the stomach, and whenever possible to implant the duodenum into the stomach on its posterior aspect. H. F. WATERHOUSE.

Leitfaden der Electrodiagnostik und Electrotherapie. By Dr. TOBY COHN. Berlin: S. Karger. 1899.

DR. COHN has for years supervised practically the electrical methods used both for diagnosis and in treatment in connection with Professor Mendel's lectures in Berlin. His book commences with a description of the apparatus used for the application of electricity in connection with medicine. This description is throughout accompanied by a clear scientific explanation of the various electrical phenomena concerned. In the second chapter the various effects of electricity, both faradic and galvanic, upon muscles and nerves of the body are noted *separatim;* and this section is illustrated by a series of ingeniously contrived figures, in which the points upon the skin at which the electrodes are properly to be applied, are shown on a sheet of tissue paper, bearing a representation of the external features of the part, superimposed loosely upon an anatomical drawing of the nerves themselves, and their regional relations. The third chapter is concerned with the methods of the application of the electric current. Chapter iv. commences the consideration of the various alterations produced in the electrical reactions of the muscles and nerves by disease. Commencing with the motor apparatus, the changes which may arise are divided into (*a*) purely quantitative, (*b*) quantitative and qualitative, and (*c*) purely qualitative. Chapters follow upon the methods of electrical investigation into the condition of the organs of sense, of the resistance to the electrical stream, and on the benefits exerted on the body generally. Local affections of the nerves and muscles, and of the nervous system in functional disorders, are next treated of. A section is added descriptive of the apparatus best suited for electro-therapeutical use, with an appendix dealing with static electrisation. The entire work is illustrated with figures and by examples which clearly explain the meaning of the text, while the more technical data are also discussed in an easily comprehensible manner. For any one who is desirous of becoming better acquainted with the practical application of electricity for the treatment of disease, and also with the rationale of the actions produced, Cohn's volume should prove exceedingly valuable. A. LOCKHART GILLESPIE.

The Diseases of Children: A Clinical Handbook. By GEORGE ELDER, M.D., and J. S. FOWLER, M.B. London: Charles Griffin & Co., Ltd.

THE authors, who are "clinical tutors" in the Royal Infirmary at Edinburgh, have written this handbook for the use of "students attending courses of instruction on the diseases of children." It seems to us to be well adapted to its purpose. The introductory section deals with the anatomy and physiology of infancy and childhood, with natural and artificial feeding, and with general therapeutics. The section on diagnosis occupies rather more than one-fifth of the whole work. It is very carefully and thoroughly done, and is the most valuable part of the book. The various methods of clinical examination are described, and the principal symptoms of disease in childhood are passed in review, and their significance explained. Any student who will thoroughly carry out by the bedside, and in the out-patient room, the methods of case-taking and study here given, cannot fail to obtain a sound practical acquaintance with the diseases of childhood. The only omission we note here is, that no directions are given as to recording the weight and height of patients, nor for the use of the cyrtometer and measuring tape in chest deformity, etc. On the other hand, the method of fontanelle tracing as here described will be new to most readers, and of decided interest. This section is practically the only part of the work which is illustrated.

The rest of the book gives a concise account of the medical diseases peculiar to infancy and childhood. The pathology is intentionally treated of but briefly; but the symptoms, diagnosis, prognosis, and treatment are given in fairly complete if condensed form. The book contains no references to authorities, no illustrative cases, and no appendix of formulæ, etc. For a student's bedside guide, it may be cordially recommended.

JOHN B. HELLIER.

Die Localen Erkrankungen der Harnblase. Von Dr. OTTO ZUCKERKANDL. Wien. 1899.

THIS work on the diseases of the urinary bladder forms one of the volumes in the great undertaking edited by Professor Nothnagel, under the title "Specielle Pathologie und Therapie." It fully maintains the character of the above-mentioned encyclopædia for exhaustiveness and completeness. The book is divided into two sections of nearly equal size. The first part, entitled the general part, deals with the topographical anatomy of the bladder, the methods of examination of the bladder, the symptoms of diseases of the bladder, and the pathological changes in the urine found in these diseases. The special part concerns itself chiefly with inflammations of the bladder, vesical calculus, and new growths. Whilst there is little that is new or original in this work, it is an excellent compendium of information, and may be said to contain all that is known concerning the diseases of the urinary bladder.

H. F. WATERHOUSE.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF

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THE REACTION OF THE URINE.

STERN (*Med. Rec.*, N. Y., Oct. 29, 1898) discusses the clinical methods and reliable results obtained thereby, in the light of numerous observations carried out by him thereanent. He, with reason, complains of (*a*) the lack of a recognised standard, an empirical unit of acidity or alkalinity, (*b*) the incomplete knowledge as to the significance of the variations in urinary acidity or alkalinity. Instead of computing the proportion of acid or alkali present in any sample of urine in terms of oxalic acid, as is the common custom, or by any other specified acid value, he imitates Ewald's method of notation in the recording of gastric acidity factors (seemingly unknown to him), by regarding neutralisation of equal parts of urine by equal amounts of decinormal alkali solutions as represented by the number 1 (synonymous with Ewald's 100). Instead of sodium hydrate, he prefers a solution of hydrate of potassium, because it causes less foam (a reason of curious derivation). A decinormal solution of oxalic acid serves him for the converse estimation of urinary alkalinity.

The indicator recommended is phenolphthalein, controlled by the use of litmus paper. (The first gives erroneous results when employed in the acidi- or alkali-metry of urine, owing to the ammonium salts present; the second is but grossly delicate.—A. L. G.)

The results of many estimations (which, though subject to the abovementioned points of error, are comparable within limits) afford much of value.

Thus, from 870 analyses of the urine of healthy males during various hours of the day, and of 606 healthy women similarly, the minimal acidity of the urine is shown to occur about 6 P.M., the maximal value at 6 A.M., in both sexes; the acidity rising after 6 P.M. in females, and after 7 P.M. in males, almost continuously up to the morning maximum. In the females the maximum and minimum of acidity were less than in the males.

In five fasting males the mean minimum acidity of the urine shows practically the same curve after twenty hours to twenty-four hours' fast, a rapid fall occurring after the fourteenth hour. In pregnant women the minimum is at 4 P.M.

Graphic plottings of the twenty-four hour acidity-values, in fourteen cases of diabetes mellitus, practically showed the same variations as in normal men, but a greatly heightened mean acidity. In place of a mean maximum at 6 A.M. of 6·8 (male) and 6·2 (female) acidity, the diabetics yielded at the same hour—also their maximal—7·9 on a mixed diet, 7·2 on milk, and 9·3 (at 5 A.M.) with a rigid meat and fat dietary.

In these diabetics the urinary acidity, thus determined, coincided also, as to its hour of average minimum, very fairly with that of health. With a mixed diet, 5 P.M.; under milk, 4 P.M.; on meat and fat, 3 P.M., were the periods of minimal acidity values.

Stern investigated *in propriâ personâ* the effects of diet, lithium citrate, piperazin, lysidin, uricedin, upon his urinary acidity. Of these, uricedin alone prominently lowered the acidity of the urine; proteid diet most effectually raised it. The causes underlying the changes of the acidity of urine are little understood as yet, and until we shall learn more about them our treatment of urinary hyperacidity must naturally remain a more or less empiric one.

IDIOPATHIC DILATATION OF THE COLON AND PHANTOM TUMOURS.

REGINALD H. FITZ (*Am. Journ. Med. Sc.*, Philadelphia, August 1899) deals with the extremely interesting subject of phantom tumours of the abdomen and the relation idiopathic dilatation of the colon bears to them, as well as with the treatment properly advised in either of these conditions from a surgical standpoint.

Bright, in 1838, distinctly expressed his opinion that enlargement of the abdomen, in part or as a whole, suggestive of tumour, while accompanied by nervous symptoms of a functional type, would often by "a little observation" be found to be of spurious origin. Addison and Gull (1854), Greenhow (1857), and Da Costa (in 1871) investigated the subject, the last observer especially insisting on the occurrence of phantom tumours in persons not of hysterical habit.

Fitz, then, in noting further records of tympanitic tumours, as described in medical literature, remarks that they "are by no means of uniform significance." He then gives details of a case seen personally. A female, æt. 21, had had in childhood occasional convulsive attacks: when 16 or 17, had suffered from nervous exhaustion, and later from severe pains in the lower abdomen; occurring irregularly, and without obvious cause, and lasting about ten minutes. Just before her visit these attacks had increased in frequency up to two or three a day, accompanied by rectal hæmorrhage on occasion. Later, complete arrest of intestinal peristalsis supervened, neither fæces nor gas responding to salines or enemata. Operation was agreed upon, and the patient etherised, when palpation of the abdominal walls induced the passage of gas; firmer pressure continued expulsion, until the abdomen became flaccid and flat. No further symptoms of actual disease occurred.

Anæsthesia, as a rule, dismisses phantom tumours. Recent medical literature, however, affords many instances in which permanent enlargement of the colon has simulated in all its symptoms those which are characteristic of phantom tumours. They go to show that increase in the size of the large bowel may sometimes occur with no organic cause, save fæcal accumulation, and may suffice even to bring about a fatal result after producing prolonged discomfort and deformity. Two types are given, the one beginning early, perhaps in infancy, and often called congenital; the other becoming apparent in those of adult years.

Osler's patient of 7 months, whose previous natural evacuations numbered but five or six; Walker and Griffiths, in whom the abdomen was unusually large within a few weeks from birth; Rolleston and Howard's 2-months-old case, and Formad's at 2 years, with a remarkable degree of deformity attendant, are noted, followed by the details of an instance observed by Fitz himself in a girl of 14, who had suffered from the condition since her second year of life. No benefit accrued from treatment in this case.

As in one of Osler's cases the colon was found to be dilated from end to end, during an exploratory laparotomy, and no obstructive cause was detected below it, the dilatation could hardly be regarded as other than idiopathtic, in this case at least; though evidence exists that a second form of infantile dilatation of the colon obtains, and that, congenital. Defective expulsive power probably accounts for the idiopathic; constrictions or defects of the gut, for the congenital forms.

The details of a case are given in which a phantom tumour appeared in a woman of 37 years, of neurasthenic type, a year or two before examination.—Laxatives and enemata failed to reduce the bulk of the abdomen. An exploratory incision revealed a much enlarged sigmoid and an adherent appendix, the latter being removed. No relief followed, and eventually the abdomen was reopened, and the large sigmoid flexure resected. Convalescence was favourable and cure established. The phantom tumour here, although it disappeared on etherisation, and presented all the characteristics of such swellings, proved to be an idiopathic dilatation of the colon with no causal constriction or history of antecedent impaction of fæces, only one of a constipated habit.

Diagnosis of Strictures of the Bowel.

Heidenhain (*Arch. f. klin. Chir.*, Berlin, Bd. lvii.), from a consideration of thirty-eight cases, concludes that it is not such a difficult matter after all to accurately diagnose the existence of intestinal strictures. Careful questioning as to history, painstaking examination by inspection, gentle percussion, palpation externally and *per rectum et vaginam*, consideration of previous cases personally seen or read of, may lead not only to successful diagnosis, but to one which is correct often in particulars. Heidenhain thinks that spasmodic muscular action in the intestinal walls may simulate obstruction, as, for example, in lead colic. He illustrates this with three examples in which muscular spasms were the more than probable cause of obstruction. Of his other cases, six were actual narrowings of the lumen, eight stenoses from peritoneal bands, six from volvulus, and three due to true coprostasis, and relieved by high rectal irrigation,

SURGERY.

UNDER THE CHARGE OF

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TRAUMATIC RUPTURE OF THE COLON.

MR. MAKINS of St. Thomas's Hospital has had under observation two cases of rupture of the ascending colon, both of which terminated in recovery. The first was a man æt. 24, who was caught between two railway waggons. He was admitted to hospital on the thirty-fourth day, with a large, tense, ill-defined swelling, occupying the right half of the abdomen. On incision, a large irregular cavity walled in by intestine was found, containing dirty coloured pus, fæcal in odour, but containing no distinct fæcal lumps. On succeeding dressings there was abundant discharge and obvious fæcal matter in small quantities. The discharge then diminished, and the sinus was firmly healed at the end of a month. The author believed that the original injury to the colon was a severe contusion, and that sloughing subsequently took place.

The second was a man æt. 26, who was struck in the right flank by the end of a heavy log; there were the usual symptoms of ruptured intestine, and the skin of the abdomen was grazed and abraded just above and within the anterior-superior spine of the ilium. The belly was opened in the middle line seven hours after the injury, and was found to contain muddy brown, fæcal-smelling fluid and blood clot; two rents were found in the ascending colon at its junction with the cæcum—an anterior one, of the peritoneum only; the other, posterior, through all the coats. Both were closed with Lembert's sutures, and the belly washed out. Some bruised omentum was also removed. There was some emphysema of the cellular tissue of the ascending mesocolon. His recovery was interrupted by an accumulation of stinking pus in the iliac region, which was evacuated through the lower angle of the abdominal wound on the seventh day, but was ultimately quite satisfactory. Mr. Makins gives a résumé of twenty-one cases of rupture of the intestine that have been under treatment in St. Thomas's Hospital during the last ten years. They all resulted from severe localised violence to the abdominal wall. The small intestine was ruptured in sixteen, and the colon in five instances. In nine cases the exact point of impact was indicated by a local bruise or abrasion, and in eight of these the seat of injury was situated below the level of the umbilicus, which may be described as the dangerous area both for the lower part of the small intestine and for those parts of the colon which may lie within it, namely, cæcum, ascending, descending, and sigmoid colon, and the transverse colon when it hangs down in a U-shaped loop.—*Ann. Surg.*, Phila., Aug. 1899.

DEFORMITY FROM DISLOCATION AND FRACTURE OF THE CLAVICLE.

M. MORESTIN reports the case of a young woman who presented two unsightly projections of the right clavicle; the first was in the middle of the bone, and resulted from an old fracture; the second was the dislocated sternal end of the bone; the latter projected whenever the shoulder was elevated or carried backwards. The patient was anxious to be relieved of the deformity without a scar which might be visible "in certain circumstances." As this condition was incompatible with an operation for suturing the inner end of the bone to the sternum, the author proposed to remove the inner two-thirds of the bone by means of an incision placed far enough out to allow of its being hidden by the portions of dress which cover the shoulder, "dans les toilettes les plus décolletées." He made an incision 5 cms. in length at right angles to the clavicle, and at the junction of its outer fourth and inner three-fourths; through the wound thus made he removed the portion of bone indicated with the best possible result.—*Rev. de chir.*, Paris, Aug. 1899.

EXTRA-UTERINE GESTATION RUPTURING INTO THE BLADDER—SUPRAPUBIC CYSTOTOMY.

M. **HUE** of Rouen records two cases of the above. The first was a woman æt. 62, suffering from calculous cystitis; the urine escaped by the vagina; the patient's history was very vague, and indicated that her present condition had lasted several years. On examination, a vesico-vaginal fistula was found in the anterior cul-de-sac; the sound revealed the presence of a friable calculus in the bladder; the urine was purulent and ammoniacal. Hue decided to open the bladder above the pubes; in the extraperitoneal tissue he found strong, scar-like bands, and in endeavouring to separate them his finger entered the bladder. An irregular friable calculus was found, and was removed in fragments; in addition he could feel hard irregular fragments embedded in the trigone; one of these had perforated the vesico-vaginal septum and caused the fistula; the various fragments were derived from the cranial bones of a fœtus and from a lithiopædion. The bladder was washed out and drained. The patient recovered.

The second was a woman æt. 64, who had had several miscarriages; at the age of 38 she had peritoneal symptoms; at 57 she was seized with violent pains in the belly, after which the urine became purulent and fœtid. The sound revealed a stone in the bladder. M. Hue dilated the urethra, and introduced the index finger; the calculus was friable, and contained a foreign body in its centre; the latter was extracted, and was found to be the skeleton of the upper limb of a fœtus between the fourth and fifth month. The finger, when re-introduced into the bladder, discovered an opening in its roof, occupied by other bones. Three weeks later he opened the bladder above the pubes; immediately above the bladder there was a distinct tumour representing the fœtal sac; this was opened, and delivered of all the elements of a fœtus; both cavities were washed out and drained. The patient made a good recovery, excepting some incontinence from the forcible dilatation of the urethra.—*Rev. de chir.*, Paris, Aug. 1899.

LATE DEATHS AFTER CHLOROFORM ANÆSTHESIA.

DRS. SALEN and **WALLIS** report two deaths, which took place on the second and third day respectively, after an abdominal operation performed under chloroform. They point out the necessity of the most careful investigation before coming to the conclusion that death resulted from chloroform, and of excluding all other possible causes of death following operations, *e.g.* intercurrent diseases, septic infection, intoxication from antiseptics, etc. They present the following conclusions:—(1) Chloroform may cause death several days after its administration, from causes which are at present unknown. (2) The changes found in such cases after death chiefly consist in fatty degeneration of the heart-muscle, of the liver, and of the kidneys. (3) The degeneration, although usually present in several of these organs, is more often specially localised in one or other; the resulting clinical features vary accordingly. (4) The degeneration in question is analogous to that observed in animals dying from long-continued chloroform anæsthesia.—*Centralbl. f. Chir.*, Leipzig, 19th August 1899.

"ESSENTIAL" RENAL HÆMATURIA.

FLODERUS reports a case from Lennander's clinique at Upsala, in which the kidney, excised on account of hæmaturia, appeared normal to the naked eye. Microscopical examination, however, showed a disseminated sclerosing glomerulitis, with progressive sclerosis in the surrounding connective tissue, and, to a certain extent, fatty degeneration and atrophy of the renal epithelium. The author classifies the recorded cases of "essential" renal hæmaturia as follows:—(1) In hæmophilia; (2) from vasomotor disturbances; (3) from mechanical causes; (4) from kidneys, which are the seat of nephritis; (5) cases which cannot be classified because imperfectly recorded, the kidney having been rarely submitted to microscopical examination. The author recommends general medical treatment in the first instance, rest in bed, careful diet, tonics, hydrotherapeutic measures, etc. When these have been tried and failed, and in the absence of hæmophilia, he advises against unnecessary delay in operative interference, especially if there be any suspicion of a malignant growth or of tuberculosis.—*Centralbl. f. Chir.*, Leipzig, 26th August 1899.

NERVE-STRETCHING IN VARICOSE ULCERS OF THE LEG.

BARDESCU of Bucharest is a supporter of the view that the chronic ulcer of the leg is dependent upon altered trophic innervation, as well as upon changes in the venous circulation, and that, in order to counteract this element, it may be necessary to stretch the nerve supplying the region in which the ulcer is situated. He reports two cases in which he resected the internal saphena vein in the thigh and stretched the external popliteal nerve where it crosses the neck of the fibula. Chipault of Paris has propounded the same views with regard to varicose ulcers, and has operated upon similar lines to those indicated.—*Centralbl. f. Chir.*, Leipzig, 15th July 1899.

TRANSPLANTATION OF SKIN FLAPS BY KRAUSE'S METHOD.

WAGNER reports the results obtained by this method in the clinique of Mikulicz at Breslau. The skin on the front of the thigh is disinfected with soap and water and alcohol; a strip of skin, pointed at the ends, as broad as 8 cms. and as long as 45 cms., is then excised along with the subcutaneous fat; the latter is removed with scissors, and the flap is laid on the wound to be covered, after scraping off the granulations. The gap left after excision of the flap is closed with sutures. The dressing is not changed until the ninth or tenth day.

The procedure was carried out in fifty-one cases, mostly ulcers of the leg, also in cases where tumours or scars had been excised. The results were not very satisfactory, as the percentage of failures (24·4 per cent.) was considerably greater than in grafting by Thiersch's method, which on the whole is to be preferred.—*Beitr. z. klin. Chir.*, Tübingen, Bd. xxiv. Heft 1.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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CÆSAREAN SECTION AFTER VAGINAL FIXATION.

DIETRICH (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 32) gives in detail a fatal case of Cæsarean section after vaginal fixation. The patient, æt. 24, was treated for some time with pessaries for mobile retroflexion. This treatment being useless, Fritsch performed vaginal fixation. The case did well, and the patient resumed work in less than three weeks, the pain formerly complained of having gone. A month later, however, she had symptoms of pelvic peritonitis, relieved by opium and local applications. Two years later, these symptoms recurred, and shortly afterwards she became pregnant. During the early months there was severe abdominal pain and vomiting, with painful micturition. At the seventh month there was some uterine hæmorrhage. On examination, there was found a swelling the size of a child's head bulging into the vagina. The cervix could not be felt under chloroform, and with the whole hand introduced into the vagina the os was felt opposite the promontory, and the fundus firmly fixed to the vaginal wall. Abdominal section was performed at full time in the hope that the adhesions might be separated. The uterus was, however, so firmly fixed that it could not be brought forward to the abdominal wound. The uterus was opened by a transverse incision. There was considerable escape of meconium into the peritoneal cavity. Death on the third day from septic peritonitis. In comparing this case with others already reported, Dietrich notes that both uterine walls were equally thickened. Strassmann and others have noted great thinning of the posterior uterine wall. He discusses the relationship of the peritonitic attacks which followed the operation, which he attributes as the cause of both. Dietrich believes vaginal Cæsarean section might have been the better operation. The original operation was performed by direct suture of the vesico-uterine fold of the peritoneum to the vagina. To this method Duhrssen attributes all the cases of complication during labour after vaginal fixation, and to prevent those he adopts the method of closing the plica by itself. As Dietrich shows, however, by both methods serious complications at labour have been recorded.

In a case reported by Graefe, fixation was performed without opening the peritoneum, but Cæsarean section was nevertheless found necessary.

A CASE OF CÆSAREAN SECTION AFTER VAGINO-FIXATION.

FUCHS (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 32) regards this method of treatment of retroflexion as the one most frequently followed by serious complications. Patient, æt. 45, last child six years previous to coming under observation. The uterus was fixed to the vagina at the same time as an extra-uterine fœtus was removed by the vaginal route. During pregnancy, after vaginal fixation, there was considerable abdominal pain, also uterine bleeding. The cervix could not be felt, the vagina being filled with a smooth bulging tumour. Under anæsthesia the cervix was felt over the promontory, anterior lip swollen, the posterior could not be reached. Cæsarean section was decided on as the only means of completing delivery. The uterus could not be drawn forwards, and was therefore opened *in situ*, and sutured in the usual way. Patient made a good recovery.

THE USE OF PROTARGOL AS A SUBSTITUTE FOR SILVER NITRATE (CREDE) IN OPHTHALMIA NEONATORUM.

ENGELMANN (*Centralbl. f. Gynäk.*, Leipzig, 1899, No. 30) states that, according to Neisser, protargol has a favourable effect on the gonococcus. It penetrates the tissues, and causes no pain or irritation, the latter quality rendering it preferable to the nitrate.

Darier regards it as the best remedy for blenorrhœa neonatorum. Essman records 277 cases in which he used protargol, namely—

29 with a 2 per cent. solution.
248 ,, 1 ,, ,,

In only 20 per cent. of the cases were there the slightest signs of irritation. Engelmann regards a 1 per cent. solution as rather weak, and used a 20 per cent. solution in 100 cases with the following results:—

In 27 per cent. no secretion formed.
52 ,, secretion disappeared on second day.
24 ,, ,, lasted over one day.
4 ,, ,, ,, four days.

So that in 80 per cent. there was almost no secretion produced. The advantages of protargol over the nitrate are—(1) Less irritating, (2) does not stain, (3) comparatively cheap, (4) retains its qualities longer.

THERAPEUTICS.

UNDER THE CHARGE OF

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ACTION OF IRON AND ETIOLOGY OF CHLOROSIS.

HOFMANN has investigated the mode of action of iron by experiments on rabbits. He used rabbits rendered anæmic by bleeding, and which then were or were not fed with iron. In addition, normal healthy rabbits were fed with iron. The supposed blood-forming organs were specially investigated, namely, liver, spleen, and bone marrow. Blood counts and hæmoglobin estimations were also made. Iron in every form is absorbed in the duodenum, and circulates in the blood combined with an albuminous body in the leucocytes. It is probably excreted by the mucous membrane of the large intestine. Anæmic animals fed with iron recover more quickly than those without iron. After a hæmorrhage the only organ which shows a corresponding regenerative activity is the bone marrow, in the form of a hyperplasia of its parenchyma. In normal animals iron-feeding causes a slight increase in the number of the circulating erythrocytes, but the marrow shows no hyperplasia, though there is an increase of iron and fat cells. In all cases the hæmoglobin remains somewhat behind, but corresponds to the number of the corpuscles. There is never an excess of hæmoglobin. Hofmann therefore concludes that the action of iron is to stimulate the normal physiological activity of the bone marrow, causing a more rapid maturation of the young cells into erythrocytes without nuclei.

As the result of experiments with the newer organic iron preparations made with albumin or from blood, Hofmann concludes that their use is unnecessary or irrational, as they are absorbed and circulate in a similar manner to the inorganic salts, and are only active according to the percentage of iron which they contain. From his studies Hofmann holds that chlorosis is due to a transient incapacity of the blood-forming organs occurring during puberty, or to a hypoplasia of those organs, manifesting itself more or less throughout life, and occasionally resulting in the hypoplasia of the vessels described by Virchow. This weakness of the blood-forming apparatus manifests itself in the production of less valuable erythrocytes, deficient in hæmoglobin and altered in form.—*München. med. Wchnschr.*, 18th July 1899.

TREATMENT OF SUMMER DIARRHŒA IN INFANTS.

In the *Therap. Gaz.*, Detroit, Aug. 1899, there is a series of articles by different authors on this subject. Jacobi says that the avoidance of errors in hygiene and diet is the best preventive. The debilitating influence of prolonged summer heat must be counteracted by improving the vitality and powers of resistance. Frequent bathing during the day in pleasantly cold water, very light body-clothing, of cotton or thin flannel, not linen, and very light bed-clothing, with frequent and careful washing of the mouth, all tend to prevention. Cow's milk, if used for feeding, should be diluted and sweetened with cane-sugar. The diluting agent may very well be some decoction of cereals containing starch, as both the salivary and pancreatic juices of infants contain diastatic ferments. Over-feeding is an extremely common cause of diarrhœa. Summer diarrhœa is not a pathological entity, as it comprises all forms of diarrhœal discharge, from an acute intestinal catarrh to follicular enteritis, and streptococcic and bacillary gastro-enteritis. If the stomach is affected it should be irrigated, an operation easily carried out by means of 20 or 30 (French) elastic catheter, a $\frac{3}{4}$ per cent. solution of common salt being used, to which may be added a little thymol or sodium bicarbonate. About $3\frac{1}{2}$ oz. may be used in the nursling, and double that amount or more in the young child, the irrigation being repeated until the fluid comes away clear. The intestines should be emptied by purgatives and enemata; castor-oil and calomel, both without opium, are the best purgatives. The enemata may be thickened and made more soothing by the addition of starch, linseed decoction, or gum acacia. The water of the enemata becomes absorbed and is useful in making up the loss of fluid from the body. Vomiting and severe diarrhœa indicate the entire withholding of food for some hours, for if it be given no absorption takes place under these conditions. After a reasonable time small pieces of ice or a teaspoonful of hot water may be given, or barley-water, or toast or rice-water. No milk of any kind should be given at this stage, as it encourages the growth of bacteria. The raw white of egg, thoroughly beaten up and mixed with barley-water, may take its place. Jacobi often gives a mixture of one white of egg, 5 oz. barley-water, one or two teaspoonfuls of whisky, and enough salt and sugar to improve the taste. A teaspoonful of this can be given every five or ten minutes, and is ample for sustenance. After a time boiled milk may be added to it, but not more than 10 per cent. of the mixture. In most cases the intestinal tract is hyperacid, and chalk or calcium phosphate should be given to counteract this, and as astringents. Sodium and magnesium preparations are contra-indicated, on account of their purgative action. Bismuth subnitrate is also valuable. Lead, tannic acid, alum, and most other astringents of the kind are badly tolerated as a rule. Small quantities of opium may be necessary. General collapse or extreme exhaustion demand stimulation by means of hot water rectal injections, with a little whisky added, $\frac{1}{100}$ to $\frac{1}{50}$ gr. strychnine subcutaneously, or a grain or more of camphor dissolved in spirit. In very urgent cases hot saline solution may be given subcutaneously. Abdominal pain is best relieved by warm applications and opiates. The food should be chiefly carbohydrate for some time. Jacobi strongly recommends intestinal antiseptics, calomel, bismuth, alcohol, creasote, salicylate of sodium, salol, betanaphthol, corrosive sublimate, etc. During convalescence fresh air and gastric tonics best combat the want of appetite, exhaustion and anæmia.

Griffith states that in the early stages he employs free purgation by calomel, magnesia, or castor-oil, along with entire abstinence from the usual food, giving only egg-water, barley-water, or gelatin-water. By the second day the toxic substances have probably been removed, and purgatives are no longer needed, but the same method of feeding should be continued. If the diarrhœa still continue, 4 or 5 grs. bismuth subnitrate should be given every two or three hours, or chalk mixture with aromatics. Kino, tannalbumin, tannigen, and sulphuric acid are all useful in obstinate cases. Intestinal antiseptics are disappointing, in his experience, if given alone, but combined with the other remedies mentioned they do good. Opium is indispensable in the later stages, and controls especially the catarrhal condition, as it greatly lessens the discharges. Even in the early stages it may be indispensable for this purpose, but its indiscriminate use is to be carefully avoided. Rectal injections are only of special value if there be much mucous discharge from the bowel. Milk should be avoided, and whey, cream mixtures, beef-juice, and white of egg substituted for it. Alcohol and tonics are given, if their use seems indicated specially. Frequent bathing, cool clothing, and cool air are of great importance. Change of air and of diet are also very important factors in the cure and convalescence.

Holt points out that in summer diarrhœa, the initial condition is an acute intoxication, arising from the materials in the digestive tract undergoing putrefactive changes, and the consequent formation of toxins. The catarrhal inflammation of the mucous membrane comes on secondarily to this. The toxins damage the intestinal epithelium, and, after absorption, other viscera such as the kidneys. The first indications, therefore, are to stop all food, and empty the gastro-intestinal canal as rapidly and completely as possible. The stomach should be thoroughly washed out with water at 110° F., to which a little sodium bicarbonate may be added, but once is enough, and the large intestine should be irrigated with salt solution (1 drm. to the pint), three or four quarts being introduced through a soft catheter or rectal irrigating-tube. This washes out the colon, but it rapidly fills again from the small intestine, and hence the irrigation must be repeated in a few hours, and several times again in severe or protracted cases. Calomel, castor-oil, and magnesia are the purgatives which Holt uses, although he considers them less valuable than irrigation. Opium should only be used after the first stage is passed, but bismuth subnitrate is the only astringent in which he has much confidence. For the first twelve hours food should be withheld, and only hot water given, after which whey, barley-water, egg-albumin-water, weak mutton- or chicken-broth, and later beef-juice and some of the malted foods should be given. No milk should be given for at least four or five days in mild cases, and for double the time in severe ones. When begun it should be diluted five or six times with water. For prevention—proper feeding, sterilisation of milk, cool clothing and surroundings, and prompt treatment of all the milder forms of indigestion and diarrhœa, are the most important points to be attended to.

Fischer holds that the most important point is to wash out the stomach and bowels. He uses one quart of warm water, in which one teaspoonful of table salt has been dissolved, for each gastric washing, and this is repeated until the fluid comes away clear. After it no food is given for some hours, but seltzer, Vichy, apollinaris, or hot water in small quantities. A wineglassful of lime-water, several times daily, is also advantageous. On the first day ¼ gr. calomel is given every two or three hours until free purgation is produced, and this is followed on the succeeding day by two or three 1-drm. doses of castor-oil. Bismuth salts in 2- to 5-gr. doses every few hours, salol, resorcin, and nitrate of silver, are all valuable. For collapse, he advises alcoholic stimulants and subcutaneous injections of saline solution. When severe tenesmus exists, painting of the lower end of the rectum with a 2 per cent. solution of cocaine hydrochloride is frequently very advantageous. Prolapse of the rectum and anus can frequently be prevented by applying a strip of adhesive plaster from one buttock tightly to the other, so that they mechanically support the bowel and prevent its extrusion. Milk in all forms should be discontinued, and rice-, barley-, farina-, sago-, or cornstarch-water substituted. These are made by boiling a tablespoonful in a pint of water, strain through cloth, and add boiled water to make 1 pint. Cold applications and a cool room temperature are of great value in treatment. In collapse, hot baths are valuable.

Graham advocates practically the same plan of treatment as above, and insists especially on the value of irrigations of the bowel. He advises that a gallon of fluid should be used each time, with salt, boric acid, or nitrate of silver dissolved in it.

MEDICAL JURISPRUDENCE.

UNDER THE CHARGE OF

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Œdema of the Larynx in Drowning.

Dr. Max Richter (*Wien. klin. Wchnschr.*, 1899, No. 25) discusses the question of the value of this appearance as a sign of death by drowning. Œdema of the aryteno-epiglottidean folds, epiglottis and uvula, is sometimes found in bodies which have been submerged in water. Hofmann held that the condition was probably produced post-mortem, while Strassmann and others have held that it may be caused during life. Paltauf, as a result of experiments upon the dead body, arrived at conclusions corroborative of Hofmann's view, but more recently Gohndorf has investigated the subject by means of immersing larynges from human bodies and of animals in water for varying periods of time, and is of opinion that while œdema of the larynx is by no means a certain sign of drowning, yet it does not occur post-mortem so easily as Paltauf imagined. Richter instituted experiments with the view of determining the value of the condition as a sign of death by drowning, in view of the opposite opinions held upon the subject. He suspended the bodies of infants in water for varying periods of time, having first satisfied himself as to the condition of the larynx before immersion. Out of eighteen children œdema of the entrance of the air passages was found in eight, or 44·4 per cent., after from one to four days' submersion.

He also took seventy-seven larynges excised from bodies, and submerged them in water; of these, thirty-four, or 44·1 per cent., showed œdema. Richter had also the opportunity of examining twenty-three actual cases of drowning, and found a distinct œdema present in nine instances. Prolonged submersion was not necessary for the production of the appearance, although it exercised a favouring influence. Richter concludes from his experiments that the condition is a purely post-mortem appearance, produced by an endosmotic action, and also by inhibition of the fluid in which the body is submerged into the mucous membrane and loose submucous tissues, causing a swelling of these parts—a process similar to that which is seen in other parts of the body after submersion, as for example in the skin of the hands and soles of the feet. No importance, therefore, can be ascribed to the condition as a sign of death by drowning.

THE PASSAGE OF CORROSIVE SUBLIMATE THROUGH THE PLACENTAL CIRCULATION.

PROFESSOR STRASSMANN has an interesting paper on the above subject in the *Arch. f. Anat. u. Physiol.*, Supp., Leipzig, 1899. His experiments were undertaken, partly because he is of opinion that corrosive sublimate is sometimes taken during pregnancy, not with suicidal intent, but for the purpose of producing abortion, and hence the subject is of medico-legal importance, and partly also to clear up certain points in regard to previous experiments by Porak and by Mirto on the same subject.

Porak experimented on guinea-pigs with small doses of corrosive sublimate, and while he found the poison in the placenta he was unable to detect it in the fœtus. Mirto, on the other hand, utilised rabbits and bitches for his experiments, and gave large doses, which caused acute poisoning. He was successful in discovering the presence of the poison, not only in the maternal organs, but also in every instance in the fœtus. The mercury was detected chemically in these latter experiments, and well-marked microscopic changes were also found in the fœtal organs, such as necrosis of the epithelium of the urinary tubules, and disappearance of the nuclei. Strassmann carried out his experiments on all three kinds of animals, as it was important to make out whether there existed any difference in regard to the behaviour of the poison in different animals, or whether the different results depended upon the mode of administration, *i.e.* in large or small doses. Strassmann attached even greater weight to the anatomical changes produced by the poison than to its chemical detection in the fœtal organs, since a positive result in the latter case might be due to post-mortem diffusion of the poison from the placenta.

The conclusions Strassmann arrives at are—that there is no difference between the various animals experimented upon with regard to the action of the poison; that in *acute* poisoning of all these animals the mercury passes into the fœtus, although sometimes only in very small quantity, and that anatomical changes are produced in the fœtal kidneys by the action of the poison. The presence of the poison in the kidneys, as shown by chemical analysis, is, Strassmann thinks, against the view of its having arrived there by post-mortem inhibition, while the fact of the microscopic changes above described being only found in patches, is sufficient proof that they were not caused by decomposition, but were the direct result of the poison. Why the mercury should only pass into the fœtus in acute poisoning and not when small doses are administered, as the experiments showed, is a point requiring further elucidation, but possibly it may be due to the greater alterations produced in the tissues in acute poisoning, facilitating the passage of the poison through the placenta to the fœtus.

THE DETECTION OF CARBONIC OXIDE BLOOD.

IN the *Vrtljschr. f. gerichtl. Med.*, Berlin, Bd. xviii. Heft 1, Professor Ipsen records a new chemical method for the detection of carbonic oxide in blood. It is based upon the fact that reducing agents act more quickly upon ordinary hæmoglobin than upon CO-hæmoglobin. From the well-known reducing action of grape-sugar upon alkaline solutions of various metallic salts, Ipsen was induced to try it as a means of detecting CO in blood.

The characteristic reaction consists in the different colours produced in solutions of CO blood and ordinary blood, of slightly alkaline reaction, after the addition of grape-sugar. A solution of ordinary blood is tested at the same time and with the same precautions, as a control experiment, in order to prevent any chance of error.

The process consists in taking two test-tubes, into one is put 4 to 5, but better still (if sufficient blood is available) 10 c.c. of the blood to be tested, while into the other tube the same quantity of ordinary blood is poured. To both, a few drops of caustic alkali is added so as to produce a faint alkaline reaction, and then as much finely powdered grape-sugar as will go on the point of a small knife. The ends of the tubes are then well stoppered with cotton-wool, from which the fat has not been abstracted, and some fluid paraffin of 45°–50° C. melting point, is poured over the surface of the cotton-wool, in order to prevent any communication with the outer air. When the paraffin has solidified, the tubes are carefully shaken up and placed in a cool spot. After a lapse of four to five hours a marked difference in colour is noticed in the two tubes; that containing CO blood has a light cherry-red colour, while the other, containing ordinary blood, appears of a very dark red hue. This distinction becomes more apparent during the lapse of the first day, and is retained, though not to such a marked degree, for weeks and even for months. The distinctive reaction may easily be obtained even with blood containing 16 to 12 per cent. of CO. With practice, and always with the aid of a control experiment, it is possible to detect 10 to 8 per cent. This method for detecting CO blood—as is also the case with other methods depending on reduction processes—is much more delicate than the spectroscopic test.

DERMATOLOGY.

UNDER THE CHARGE OF
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IMPETIGO CONTAGIOSA.

UNNA and Mde. Schwenter Trachsler have subjected this common ailment to a critical examination (*Monatsh. f. prakt. Dermat.*, Hamburg, 1899, Nos. 5, 6, 7, 8). The historical portion is of much interest, and not only reflects the gradual evolution of ideas regarding it since Tilbury Fox described it as a separate disease in 1862, but enables Unna to indicate wherein his own opinions have undergone change subsequent to 1880. The authors desire to replace the designation impetigo vulgaris for that hitherto employed, in order to facilitate its discrimination from other less frequent impetigines. It seems, however, a pity to abandon an epithet which, besides having use and wont, really connotes the main element of the disease, its ready communicability. The characters of impetigo contagiosa are so constant, and manifest so few variations, that it is easily distinguished clinically from other similar skin affections, even from the rarer impetigines, such as those due to the staphylococcus and streptococcus. The primary eruption consists in small red, isolated points, on which, in course of from twelve to twenty-four hours, minute, centrally placed, clear vesicles form. In some of these the contents continue clear, in others they assume a milky aspect in one or two days. But whether or not, this primary vesicle may abort, drying up into a crust the size of a mustard-seed, which, on separating, leaves a red stain. In most cases, in course of from three to five days from the first, large concentrically disposed crusts appear rather suddenly. These, when typical, are translucent, horny, of a honey yellow, giving the impression of being composed of pure serum. This holds at least for the cheeks, chin, and forehead; but in addition, in uncleanly individuals, near the mouth, ears, or on the hands, there are greyish green, purulent, or brownish, blood-stained ones. The crusts may persist a long time, enlarging slowly. If displaced by scratching or otherwise, the serum which wells up gives rise to new ones, not so bulky but wider. The origin of these larger crusts is due to the superadded formation of secondary vesicles, quite superficial, which insinuate themselves directly under the horny layer. In some cases this is owing to streptococci having become mingled with the impetigo cocci. When the crusts have fallen off, and the subjacent erosion become cornified, a round, smooth, red mark remains, an evidence of the marked dilatation of the vessels and the thinning of the epidermis. When it attacks the scalp it is often confused with the crusted eczema of that region met with in children. Here the eruption is more scattered, except on the occiput. The primary vesicles are seldom seen, while the secondary produce very thick crusts; for they soon burst, and the serum coagulates round the hairs. If the hairs are extracted, they show a much swollen root-sheath. The impetigo crusts afford a favourable sphere for pediculi. But these parasites are but an accidental complication, have no connection with its etiology, and are only met with in a proportion of cases. Only very occasionally is the disease encountered on the mucous membrane of the lips, gums, tongue, or throat. Another rare complication is with purulent discharge from the external ear; this, though evidently in relation to impetigo contagiosa, does not cause any affection of the drum, nor produce perforation or otitis media. Very frequently, yet apt to be overlooked, is consecutive swelling and tenderness of the submaxillary glands when the face is implicated, of those of the neck when the scalp. There is no interference with the general health, any feeling of illness previous to the eruption is exceptional. Should there be, the disturbance is due to complications, and not to the impetigo. Itching in uncomplicated instances is but slight, and chiefly at an early stage. Infection most commonly occurs between 3 and 10 years of age, either at school, or by playing with those affected. Impetigo caused by true pus-producing staphylococci exhibits vesicles which are really epidermic abscesses, appearing as hemispherical greenish yellow pustules, with an inflammatory areola. These last long, and form a small and thin crust. They are infrequent, isolated, occur over the whole body, and principally in adults. They are followed by deeper lesions, as boils or abscesses. The analogy with impetigo streptogenes, so rarely met with and of such evil prognosis, is chiefly theoretical. In this there is in the main a serous exudation, which but slowly coagulates; so that the loose, greyish yellow, muddy, and for the most part large, vesicles persist long. These may be diffused over the trunk in children, and lead locally to necrosis of the skin, and generally to sepsis. In treatment, it is to be borne in mind that the chief cause for the origin and propagation of the impetigo vesicles is an abnormal soakage of the epidermis. Thus it is that the skin in the neighbourhood of the mouth and nose in little, ill-tended children, so continually wet with secretions, or that close to eyes affected with conjunctivitis, from which tears overflow, are the areas of predilection. Hence, after the crusts have been cautiously removed with a blunt instrument, the hair, if the scalp is involved, being cut, the parts are well washed with soap and warm water, dried, and several times a day smeared with a zinc sulphur paste, which exerts a much more desiccating effect than an ointment. By selecting crusts as free as possible from impurity, the authors have been able to isolate a micrococcus which assumes both an ochre and a white colour. This has been inoculated with success, and reproduced the characteristic features of impetigo contagiosa. This in certain respects resembles both the staphylococcus and the streptococcus, but there are differences which are carefully formulated. There appears no reason to doubt that the true source of the disease has now been discovered, though its entire life history has not yet been worked out.

THE ETIOLOGY OF ECZEMA.

THE first of the questions submitted for discussion at the Congress of Dermatology in Paris next year is that of parasitism in eczema; and Sabouraud, with the object of clearing the ground, has in an admirable article (*Ann. de dermat. et syph.*, Paris, April 1899) stated concisely the various opinions held as to its causation. There are three views, with certain minor modifications, currently maintained—(1) Eczema is a disease due to an internal, diathetic cause. The parasites encountered are saprophytes of no importance, they neither produce nor modify it, but solely exist. (2) Eczema is essentially due to an internal, diathetic cause. But the parasites met with have a real value either in originating, complicating, or modifying the lesions. (3) The immediate and necessary cause of eczema is a microbe, the question of soil or of diathesis is of no consequence, or cannot be proved. But at the outset there is a problem to be solved—Is eczema a definite entity? To settle this, each of the types of that now termed eczema must be studied individually and completely, which has not yet been attempted seriously. Taking up, then, these views seriatim, Sabouraud, iconoclast as he is, deals a fatal blow at the purely internal origin of eczema. He shows that this cannot be experimentally proved, and that it is a sterile doctrine which retards progress. Diatheses in medical discussions recall the dogmas of religious disputes. They are, for the believers, things intangible and indisputable. The internal cause of eczema, whatever it may be believed to be, remains for the present without direct proof of its existence, and wholly unknown as to its nature. We laugh to-day at the ideas already overturned; but we retain without a smile those which will be upset to-morrow, through want of courage to admit that we do not know what they would indicate. Why does not a champion of diathesis not give us a chemical treatise on it, to oppose to the bacteriological ones of the parasitic views? There are many circumstances which lead one to suspect that ill-defined words, undisputed axioms, and diatheses which cannot be identified, are nothing else than soft pillows for lazy heads. In fact, the idea of eczema as a diathetic disease waits its experimental realisation, for a hypothesis in science exists only as a provisional epithet, till confirmed by direct and decisive proofs. It is admitted that in nearly all the lesions of eczema, parasites in the form of microbes are found. The difficulty with regard to these commences when the part which these play in its genesis is discussed. It is certain that on the surface of the skin, as on that of any inert object, are isolated bacteria or spores. As soon as these multiply, they become not saprophytes but active parasites, for they take from the medium on which they live their means of existence, and return their waste products. The specificity of these is not now in question, but they cannot be regarded as innocuous. When on a patch of scaly and dry eczema the crusted pustules of impetigo vulgaris develop, those who hold the diathetic nature explain the occurrence by saying that the patches of eczema are not microbian in themselves, but from opening up the surface they have rendered the integument vulnerable. On these, accessory organisms have produced by inoculation the secondary lesions of impetigo. To this, one may reply by quoting a sentence from Pasteur, "Never advance anything which cannot be proved simply and decisively." Take the case of psoriasis: here the structure of the lesions, their histology, is quite that which might be in relation to an external and microbian cause, yet Sabouraud has hitherto been unable by any method of staining to discover any organism. There is an argument employed by the opponents of the parasitic theory of eczema. If the nature of curative drugs indicates that of the disease, how is it that such antiseptic remedies as carbolic acid, corrosive sublimate, iodoform, etc., so often irritate in place of curing? Treat an eczematous lesion with a solution of carbolic of the surgical strength, then investigate what you have done by the microscope. You will find that you have doubled the microbian growth. In aiming at the microbe, you have killed the epidermic tissue. Under the cellular débris which you have created, the microbe lives and multiplies, wholly undisturbed by the antiseptics profusely poured above it. On the contrary, place over an active patch of eczema compresses of boiled or even non-boiled water. The skin is now in good physical and physiological condition to regenerate itself. Do not trouble about the microbes, the skin will set about expelling them. The purification of the skin takes place not by absorption but by eviction. The grand method of defence of the skin, excellently seen in the histology of psoriasis, of impetigo, etc., consists in the reproduction of a healthy epidermis beneath the diseased, followed by exfoliation. Where unsuitable antiseptics kill the wounded epidermis, the application of warm water removes the congestion of the diseased part, regulating the cellular formation by the local temperature. The skin acquiring strength underneath the lesion becomes, as in health, impermeable to microbes, even although colonies of these, living but powerless, are constantly present on its surface. Before proceeding to discuss the last conception of the etiology of eczema, Sabouraud remarks that the sole object of his essay is to destroy, if possible, preconceived and systematised ideas. The facts which he adduces are rather calculated to demonstrate that nothing is known, than to build up a personal theory. The latest view is that eczema is a specific microbian disease, contagious and inoculable. What is most fallacious here is, that it makes all eczemas into a single and unique disease. All the light we possess on the essentially parasitic nature of eczema is derived from the Hamburg school, which no one has thoroughly checked. After an appropriate tribute to the labours of Unna, he asks if we are to regard his morococci as the specific parasite of eczema in general. Sabouraud has only been able to tackle a small part of eczema, and as the result he cannot convince himself either of the clinical or bacteriological unity of even those varieties he has investigated. Where Unna has seen invariably the morococcus, there are always present one or several species of microbes. To attain a correct knowledge of eczema, many investigators and much time are needed. In carrying this out, it is necessary neither to aim too high or too far, to fix on a limited point, accessible and small, but to reach it. In the pursuit of Truth, as in that of the Good, one must follow the expression of the Gospel: There is neither small nor great, there is only the right and the wrong. The problem of the etiology of eczema must be looked on in the light of a huge fortress which is to be taken, a fortress still almost intact, where hardly a breach has been yet made. The citadel, to speak truly, is not even invested; to attempt a general assault at first is pure folly. Just now the work to be done is more prosaic, there is still plenty of ground to clear. But, in such circumstances, the work once traced out, pioneers may be useful where generals would be idle.

The Lesions and the Nature of Erythema Induratum.

Though writers generally have included the erythema induratum of Bazin in the category of tuberculous diseases of the skin, this has not obtained universal acceptance. Audry in particular, of recent observers, concluded from his observations, that it had neither a direct nor an indirect association with tuberculosis. Thibierge and Ravaut, from the investigation of three cases (*Ann. de dermat. et syph.*, Paris, June 1899), though unable to find Koch's bacillus, saw masses of embryonic elements grouped round a more or less altered blood vessel in a connective tissue stroma. There were also numerous giant cells, while the adipose tissue was replaced at certain points by embryonic elements, in others by proteid granules, thus presenting the stages of a rapidly progressive inflammation. Of two guinea-pigs inoculated, one died in thirty-six hours of septicæmia, the other in thirty-five days of tuberculosis, and another inoculated from it likewise of the same disease.

DISEASES OF CHILDREN.

UNDER THE CHARGE OF

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Treatment of Summer Diarrhœa in Infants.

At a meeting of the New York Academy of Medicine, Dr. Chapin read a paper on the above subject, in which he arrives at the following conclusions. The essentials in the treatment of this disorder are: Prevention, which is brought about by the proper regulation of the milk supply, the providing of small parks or airing spaces for children in large cities, cleanliness in the home, and frequent bathing. He would allow the child to play in a tub of tepid water for some hours every day, and in general a bottle-fed baby should have less bulk of food and a higher dilution of milk in very hot weather than it is accustomed to under more favourable conditions. He prefers boiling or pasteurisation to sterilisation of milk. The first signs of any gastric or intestinal indigestion should be looked for and checked before any marked diarrhœa appears. In the dietetic treatment, as most cases are due to milk poisoning, all forms of milk must be temporarily withheld, and many a summer diarrhœa might be aborted if this were done for from twelve to forty-eight hours. If this has to be kept up long, one of the best substitutes is egg water made by stirring the white of the egg in half a glass of cold water; and he adds to this, to overcome its tastelessness, about ten drops of aromatic spirits of ammonia, which also tends to check the stomach irritation. Other substitutes are thin gruels from barley or wheat flour and cold whey. If milk has to be kept away for several days, mutton broth with all the fat skimmed off is also a good substitute. When the acute symptoms have subsided and milk is resumed, it must be given cautiously and at long intervals, and highly diluted. Barley-water and thin gruel are the best diluents. Medical treatment is often of less importance than dietetic; but in vomiting, drafts of tepid water should be given, which, even if rejected, wash out the stomach. It is rarely necessary to use the tube for this purpose. He usually gives a tenth of a grain of calomel every hour for six or eight doses, which has the effect of clearing the alimentary canal. Enemas of normal salt solution also hasten this object. The drug he relies on chiefly is bismuth subnitrate, but he also employs small doses of aromatic spirits of ammonia, ten to twenty drops, which seems to stimulate the infant. Alcohol is given very sparingly, and only when free stimulation is required. Opium is contra-indicated until the bowels have been thoroughly emptied, and when cerebral symptoms threaten. In cases, however, in which rapid peristalsis and profuse glandular secretion persist, a few moderate doses of opium may be of great service, and even save life.—*Journ. Am. Med. Assoc.*, Chicago, July 22, 1829.

Diphtheritic Paralysis.

Although paralysis caused by multiple neuritis may follow several of the infectious diseases in children, in the great majority of cases it depends on the toxic effects of the Klebs-Löffler bacilli. It is undoubtedly the most important of the sequelæ of diphtheria, supervening in about 10 to 25 per cent. of diphtheritic cases, but varying considerably in different epidemics. It does not seem to be in any way influenced by the treatment by antitoxin or otherwise, nor does the type of the disease, mild or severe, in any way determine its occurrence. The mechanical interference with the functions of the velum, by membrane or œdema occurring during the first week, must not be confounded with the real diphtheritic paralysis which generally manifests about the second or third week of convalescence. Sometimes progressive muscular weakness of the body causing debility and anæmia, without paralysis of the limbs, attracts attention, and upon examination paralysis of the soft palate and loss of the patellar reflex is discovered. The paralysis is the result of a toxic peripheral neuritis, a parenchymatous degeneration of the nerves not of central origin. The recent researches of Luisado and Pacchioni, elucidated by experiments upon animals, have demonstrated that the direct application of the toxin to the nervous system causes a degenerative and inflammatory action, starting at the site of application, and propagated to a greater or less extent from that point. It is probable, according to Batten, that the dominant lesion in diphtheritic paralysis is a parenchymatous degeneration of the myelin sheath of the nerves, and later of the nerve-centres in the medulla, and that this degeneration affects both motor and sensory fibres alike. As a rule, the soft palate is first attacked, and a nasal twang in the voice, perhaps regurgitation of food through the nose, and some difficulty in deglutition, are noticed. If the constrictors of the pharynx are involved, food enters the larynx, and a spasmodic cough ensues. Upon inspection, the soft palate is relaxed and immovable, with diminished sensibility and abolishment of the reflex. Next in order the extrinsic and intrinsic muscles of the eyeball are involved, causing squint, ptosis, and loss of power of accommodation. Facial paralysis is reported to have occurred, but must be very rare. Paralysis frequently attacks the extremities, occasionally being confined to a single limb, but more usually both arms and legs are affected. The danger is extreme when the respiratory muscles or heart are implicated. In some cases the pulse is very slow and soft, in others again there is great frequency, but the two conditions may alternate, and sometimes there is well-marked irregularity. Heart failure may be rapid, or more or less sudden, or come on slowly. Fatal syncope may occur at any time during the onset of the disease, at the height of the infection, or subsequently during convalescence. Pallor, weakness, and fainting spells are danger signals not to be disregarded. They may either be the result of an infectious myocarditis, or a neuritis of the cardiac nerves, and sometimes they can be traced to thrombosis or embolism. Vasomotor disturbances are evident in the disturbed rhythm of the heart's action, in the mottled appearance of the capillary circulation, with cold extremities, etc. The bladder and rectum usually escape. Post-diphtheritic paralysis of cerebral origin, giving rise to hemiplegia, is extremely rare, and yields a very unfavourable prognosis. Sensory paralysis may occur, and presents itself in the form of anæsthesia, amaurosis, or deafness.

In the treatment, absolute rest should be insisted upon, and the greatest care should be exercised in raising the patient to an upright position. The remedy *par excellence* is strychnia, either by the mouth or hypodermically, in doses of one-fiftieth of a grain. The hypodermic administration is indicated when the constrictors of the pharynx are involved and when cardiac or respiratory symptoms are present. Careful massage of the muscles of the extremities will improve the cutaneous circulation and the condition of the muscles. If respiration is endangered, electricity must be employed in addition to artificial respiration and the subcutaneous administration of strychnia.—*Arch. Pediat.*, N. Y., June 1, 1899.

PULMONARY HÆMORRHAGE FOLLOWING EXPLORATORY PUNCTURE OF THE CHEST.

KOPLIK, in this article, after stating that while formerly, in common with most other physicians, he was in the habit of using the exploring needle as a means of fixing the diagnosis, or the character of the fluid which may have been present in the chest, he has recently seen cause to refrain from this routine practice. The reason he gives for this change in his procedure is, that he has met with four cases in which alarming hæmorrhage from the mouth and nose had occurred immediately following the exploratory puncture, and, strange to say, in all the four cases no fluid was withdrawn from the chest. In the cases related the lung was adherent to the pleura, and the needle entered directly into lung substance, penetrating a blood vessel. The patients in each case exhibited signs of great unrest, and the blood spurted out of the mouth and nose mixed with frothy mucus. Immediately preceding the hæmorrhage there was a fit of coughing, which continued after the bleeding had taken place. In none of the cases was there any collapse or syncope, but he thinks it not impossible that a case might arise in which the above favourable termination would not obtain. In view of the possible occurrence of this accident, he considers the following points worthy of attention:—The introduction of the exploring needle should not be regarded as entirely harmless, and should only be undertaken when the physical signs point distinctly to the presence of fluid in the chest. It is rarely necessary to puncture more than once at a sitting, and it must only be repeated a second time when some very special circumstance indicates its expediency. The repeated puncture is fraught with greater danger of hæmorrhage, on account of the continued struggles of the child. The needle should be introduced at the point of the maximum dulness in the chest-wall, and at that point only. The puncture should be made with a needle of not more than a millimetre in calibre. The needle should not be entered to a greater depth than 2 cms. in the chest wall. It should not be entered and then withdrawn, and pointed up and down and in various directions in quest of pus, for in this way the struggling of the child, even when firmly held, is apt to cause puncture of the lung. The needle should be withdrawn as rapidly as it is entered, and the whole operation should be completed in less than half a minute. Puncture should be made cautiously on the left side, both in front and behind, in the vicinity of the heart and great vessels.—*Arch. Pediat.*, N. Y., August 1899.

TUBERCULOSIS IN CHILDREN.

BOVAIRD, from an analysis of seventy-five cases of tuberculosis in the children's wards of the New York Foundling Hospital, found in no case any evidence of the entrance of the infection by the placenta, or from wounds. In no case were tubercular lesions of the bronchial glands absent, nor in a single case was there infection of the intestinal tracts alone, though in one there might have been simultaneous infection by both routes. After reporting four cases, he sums up as follows:—The primary lesion of tuberculosis in children is regularly in the bronchial glands or lungs. He regards the early manifestations of tuberculosis as extremely uncertain and indefinite. Tubercular involvement of the bronchial glands cannot, as a rule, be diagnosed. Latent tuberculosis is often roused and disseminated by the invasion of another disease, such as measles and diphtheria, the presence of tuberculosis not being suspected. The common type is acute miliary tuberculosis, which often occurs in well-nourished infants, and is frequently confounded with chronic broncho-pneumonia or enterocolitis. The early manifestations are progressive emaciation, fever, and the presence of moist râles in the lungs. These symptoms are insufficient for purposes of distinction. The terminal lesions include—(*a*) Extension of the tubercular process in the bronchial glands and lungs, resulting in the formation of abscesses, cavities, etc.; (*b*) diffusion of the tubercular infection, constituting acute miliary tuberculosis, the principal viscera being affected in the following order—spleen, liver, brain, kidney, heart; the involvement of the brain is most important, the meningitis being invariably fatal; (*c*) when bone is involved, and there is prolonged suppuration, waxy degeneration of the viscera may occur.—*Journ. Am. Med. Assoc.*, Chicago, July 8, 1899.

ANALYTICAL REPORTS.

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NEW TABLOIDS.

(Burroughs, Wellcome & Co., London.)

THERE is no end to the novelties devised and manufactured by this enterprising firm. In addition to samples of their sugar-coated aloes and iron, and compound colocynth tabloids, we have received a number of their new effervescing tabloids, dispensed in long glass tubes with twenty-four in each.

The two tabloids first mentioned represent 4 grs. of the pharmacopœial pills of the same name, and are very convenient forms for ordinary use.

The effervescing tabloids sent us comprise those of caffeinæ citras effervescens, sodii sulphas effervescens, and artificial effervescing imitations of Vichy and Carlsbad salts. The citrate of caffeine and sulphate of sodium tabloids contain 60 grs. of the similar pharmacopœial combinations, equal to 2 grs. of caffeine citrate and about 20 grs. of the sulphate of sodium respectively. The others are rather smaller, the Carlsbad salt tabloids weighing 24 grs. each, the Vichy tabloids about 16·5 grs. Either of these last two, when dissolved in 2 oz. of water (a wineglassful), exactly reproduces the composition and strength of their natural prototypes, the waters of the Sprudel and the Grande Grille sources.

The only point we might notice about these effervescing tabloids is, that much of the effervescence has passed off before the entire tabloids have dissolved, but if, before adding the water, they are broken up into several pieces, the duration of effervescence coincides more closely with their complete solution. Not that the tabloids while still entire fail to produce an energetic disengagement of carbonic acid gas, but the more pronounced evolution of gas has become much lessened before the draught can be pleasantly taken, by reason of the presence of an undissolved though dissolving portion of their salts.

The effervescing tabloids representing the Vichy and Carlsbad waters in their natural constituents in natural proportions—each tabloid dissolved in 2 oz. of water simulating an equal quantity of either water—have been robbed of much of their unpleasantness by the conjunction with the agents of effervescence, and can be used with more comfort by those, and they are by no means few in number, who find the constituents of the Carlsbad, Sprudel or the Vichy, Grande Grille source excellently adapted for stimulating the functions of their *primæ viæ*, thus warding off or mitigating attacks of the various ills which are so often dependent upon them, than when taken in their natural condition.

CHOCOLATE-COATED TABLETS.

(Parke, Davis & Co.)

SAMPLES of Parke, Davis & Co.'s Chocolate-Coated Tablets have been submitted to us for trial. The nature of the outer coating obviates danger of the tablets causing any disagreeable taste while in the mouth preparatory to being swallowed. On the contrary, it yields the commonly appreciated taste of chocolate, but in so evanescent a manner that one would like to prolong it. There are few things which cause a greater desire for repetition than small fragments of chocolate.

The tablets sent us comprise a hepatic formula:—Euonymin, podophyllum, resin, calomel, aloin, and ipecacuanha powder, combined in the proportion of one-eighth of the first, third, and fifth constituents, one-twentieth of the second, and one-twelfth of the fourth—all fractions of a grain. A tablet to be used in the treatment of gonorrhœa contains cubebs, copaiba, sandal-wood oil, Venice turpentine, gaultheria oil, and ferrous sulphate. A third kind is made up of calomel, ¼ gr., and bicarbonate of sodium, 1 gr. A fourth tablet is made up with chocolate, but not coated with it, and is termed "Corrective, Infants." It contains small doses of calomel, powdered ipecacuanha, bicarbonate of sodium, and subnitrate of bismuth. It possesses the great advantage, for the administration to children of very tender years, of permitting reduction to a powder, which is palatable and readily taken by youthful patients.

The coated tablets also prove serviceable in older children, who so often make difficulties over the swallowing of pills or tablets, but who rather like the taste of chocolate, and can be the more easily persuaded to take what has been ordered them.

Another favourable point might be noted, *i.e.* their small size. Frequently patients believe that they cannot swallow tablets of moderate bulk, as tablets go; they scarcely can imagine the same when given tablets such as we have received.

TANNO-PUMILIO.

(Arthur & Co., London.)

DIGALLIC acid (gallo-tannic acid) when combined with the limonene, of the essential oil present in the pumilio pine, forms a body termed by the makers "Tanno-pumilio." Limonene is methylisopropyl-benzene-dihydride, $CH_3.CH : C_3H_7.C : CH_23(CH)$. This, added to two molecules of $C_{14}H_{10}O_9$, gives the formula of $C_{38}H_{36}O_{18}$ for Tanno-pumilio. It is strongly recommended for the treatment of hyperidrosis, bromidrosis, intertrigo, chilblains, *et omme hoc genus.*

OBITUARY.

John Duncan, M.A., M.D., LL.D. (St. And.), F.R.C.S.Ed, and F.R.S.E.

It is difficult to realise that John Duncan is dead. Until the end of July he appeared to be in his usual health. It was known to the few that his heart had troubled him from time to time, and had given indications that it must be gently dealt with, but there was nothing to cause any immediate anxiety, and he embarked on his usual holiday in the beginning of August. He had been taking things quietly on the day of his death; in the evening he complained of feeling unwell, he rapidly lost consciousness, and within half an hour all was over. He was buried in the Dean Cemetery in the presence of his relations and a few intimate friends.

After a brilliant course at the High School, Duncan went through the Arts Classes at the University, and took his M.A. degree with distinction. His original inclination was to study for the Bar, and there can be no doubt that, had he followed out this intention, his splendid endowments would have raised him to great eminence in the legal profession. Fortunately for our medical school, he decided to follow the footsteps of his father.

After graduating with distinction, he was House Surgeon with Syme for eighteen months. Thereafter he spent two years on the Continent.

He was appointed Assistant Surgeon to the Infirmary on his return to Edinburgh; he became one of the most ardent disciples of the doctrines of Lister, who was for many years his senior colleague in the Infirmary. Duncan took nothing for granted, and believed little on hearsay evidence, but examined, investigated, and thought out everything for himself, and he was among the first to extend the sphere of surgical bacteriology, beyond the mere details of technique. In the natural course of events he began to give courses of systematic lectures in the extramural school, and although recognition of his teaching powers was slow, it was none the less sure and enduring, for he finally attracted one of the largest classes of surgery in the school. He did not go out of his way to make his lectures popular, he cared little about diagrams or black-board sketches, and he never relied upon oratorical or dramatic methods to convey impressions to his audience; he discoursed rather in a subdued strain, really thinking aloud, and with a culture of diction and wealth of reasoning that made his lectures an intellectual feast.

It was at this stage in his career that he became a candidate for the

Chair of Surgery, which had become vacant through the death of his old friend and teacher, Professor Spence. He felt his non-election to the vacancy very keenly at the time, but, on becoming Senior Ordinary Surgeon to the Infirmary, a year or two later, he found a more congenial sphere for his talents, in the purely clinical teaching belonging to that office. It was then that Duncan really obtained the recognition which he deserved, for he soon came to be recognised as the most accomplished and most scientific teacher of clinical surgery of his day and generation. His mind was revealed as a perfected machine for interpreting and arranging impressions into logical statements and opinions.

He regarded his duties in the Infirmary as the most important work of his life. There was universal regret when his term of office expired; it was generously arranged, however, by Mr. A. G. Miller, who succeeded him, that he should retain the charge of one of his old wards, and he was thus enabled to continue his clinical teaching for a further term of five years. In 1895 he finally left the Infirmary, after having been in charge of wards for a period of twenty years; he also retired from active practice as a surgeon. Since then he has been employing some of his leisure hours in the preparation of a clinical work which would embody his large experience, and appeal to those whom he could no longer address in person.

As a surgeon, Duncan's reputation may be safely left in the hands of his old pupils; to them he gave his great talents unreservedly and without thought of reward; he cared little about notoriety, or of writing papers to journals, or of increasing his private practice. As an operator he was deliberate and sure; he was never in a hurry, and he laid more stress on the necessity and object of any operation than on the details of its performance.

Even in a short appreciation of Duncan it would be misleading to present him only as a teacher and as a surgeon. He was perhaps the most influential and the most universally respected man in his profession in Edinburgh. As a man of affairs, he was liberal and progressive in his opinions on all matters of education, professional and general. In the University Court he was the upholder of large views, and threw all his influence into widening the sphere of the University.

In the College of Surgeons, of which he filled the presidential chair with great distinction, he was the strenuous advocate of every real reform. In the extra-mural school he was a living force, a born leader, under whom the active and ardent junior members were proud to serve.

Although a Conservative in politics, and more than once asked to represent the Universities of St. Andrews and Edinburgh in Parliament, he was a Liberal in all matters connected with medical education.

As a sportsman, Duncan exhibited from his earliest day an excellence in all that can be included in the term sport.

In conclusion, it may be said that, while the Edinburgh School has had its full share of great men, there is no one of whom it has more reason to be proud than John Duncan—whose precept and example will ever remain as a cherished memory to all who were privileged to know him.

Alexis Thomson.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FIVE WEEKS ENDING SEPT. 2, 1899; AND FOR THE YEAR FROM JANUARY 1.

	TEMPERATURE.			RAINFALL IN INCHES.		SUNSHINE. HOURS.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees.		Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
		Above 42°.	Below 42°.					
Mean .	56°·02	[1] 504° [2] 1733°	0° 649°	3·8	20·1	159	998	2°·5
Observed	59°·22	[1] 603° [2] 1940°	0° 669°	1·3	20·8	216	1072	2°·65
Difference	+3°·2	[1] + 99° [2] +207°	± 0° ∓20°	−2·5	+0·7	+57	+74	+0°·15

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING AUGUST, AND SINCE JANUARY 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	TOTAL.		CONSTITUTIONAL DISEASES.		CIRCULATORY SYSTEM.		RESPIRATORY SYSTEM.		NERVOUS SYSTEM.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 969 [2] 8,945	170 195·8	201 1775	35·3 36·6	86 851	15·1 18·6	122 1717	21·5 35·31	123 1012	21·6 22·1
Actual Deaths and Rate per 10,000	[1] 1,078 [2] 8,984	189 196·6	256 1894	44·9 39·3	92 838	16·1 18·4	110 1520	19·5 31·0	113 1058	19·8 23·1
Difference from Mean	[1] +109 [2] + 39	+19 +0·8	+55 +119	+9·6 +2·7	+ 6 −13	+1·0 −0·2	−12 −197	−2·0 −4·3	−10 +46	−1·8 +1·0

	DIGESTIVE SYSTEM.		URINARY SYSTEM.		PNEUMONIA.		PHTHISIS.		CANCER.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 91 [2] 569	15·9 12·2	27 231	4·7 5·1	50 659	8·8 14·4	100 896	17·4 19·3	47 383	8·2 8·4
Actual Deaths and Rate per 10,000	[1] 131 [2] 632	22·9 13·6	33 226	5·7 5·0	56 704	9·8 15·4	99 882	17·2 19·0	74 462	12·9 10·1
Difference from Mean	[1] +40 [2] +63	+7·0 +1·4	+ 6 − 5	+1·0 −0·1	+ 6 +45	+1·0 +1·0	− 1 −14	−0·2 −0·3	+27 +79	+4·7 +1·7

* NOTE.—The figure [1] denotes the data for August, [2] for year to date.

The weather of August was extraordinary, even in this extraordinary meteorological year. A mean temperature 3°·2 over the average, 99 day degrees over 42° F. in excess, only one-third of the usual rainfall, and that occurring almost wholly on the last two or three days of the period, an increase over the ordinary duration of bright sunshine amounting to nearly 36 per cent., italicise the month.

The type of weather was almost continuously anticyclonic, the absence of wind unparalleled, the mean daily range of temperature similarly unprecedented.

For the year to date a great increase in accumulated warmth falls to be recorded, a rainfall now practically the average, and a large excess in hours of bright sunshine.

One of the most interesting facts about the weather factors of the last four months has been the persistence of a mean barometric pressure above 30·02 in., a hitherto unrecorded occurrence in Scotland.

Accompanying the great heat and drought of August, an excess equal to 11 per cent. of the average is shown by the figure for the total number of deaths, chiefly owing to constitutional, digestive, and cancerous causes. The increase in the number of deaths from digestive diseases was 44 per cent. of the expected total, from cancer as much as 57 per cent. of the same. Notwithstanding the warmth and dryness, deaths from pneumonia were rather over the normal, although the total respiratory fatalities, as well as those from nervous diseases, were under it. Influenza was credited with two deaths. Zymotic diseases caused but few deaths.

The year to date shows a slightly increased ratio of mortality, increases especially under constitutional, digestive, and cancerous affections, the last 20 per cent. of the average; and a great decrease in total respiratory deaths, 11 per cent. of those expected.

August, therefore, hot, dry, sunny, with a slight increase in variability of temperature from day to day, and almost continuously under anticyclonic distribution of pressure, was accompanied with increased mortality, largely due to constitutional, digestive, and cancerous ailments; while the year to date, warm, sunny, with a normal precipitation of rain, shows practically the same characteristics, and as well a remarkable decrease in the number of deaths from respiratory diseases.

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ORIGINAL COMMUNICATIONS.

OBSERVATIONS ON THE EXISTENCE OF ENZYMES IN CANCEROUS GROWTHS.

By George Thos. Beatson, B.A. (Cantab.), M.D. (Edin.), *Surgeon to the Glasgow Cancer Hospital, and Senior Assistant Surgeon to the Glasgow Western Infirmary.*

Apart from the unsolved problem of the *initial source* of cancer cells, it has always seemed to me a matter of great importance, especially from a therapeutic point of view, to settle definitely what is the exact relationship of the cells of a carcinoma to the surrounding tissues, for what constitutes one of their most deadly attributes is the manner in which they invade, destroy, and even replace them. Were it not for this characteristic, a cancerous tumour would be less formidable than it unfortunately is, and to the surgeon would present a more favourable field for operation. Why should it be that a small and apparently limited cancerous growth has, like the cloud no bigger than a man's hand, possibilities within it that no one can foretell? How is it that, before its increasing and advancing cells, every tissue in the body, be it muscle, bone, or nerve, has to yield and possibly eventually to disappear? To get an answer to these questions, it is necessary briefly to consider how a carcinoma invades the adjoining tissues. The general consensus of opinion is that *it is by the lymphatic system, and that it is through the lymph spaces of the part attacked, that every structure is primarily penetrated.* When this has taken place, what is the sequence of events? At first, probably, the cancer cells lie quite free in the spaces, being swayed hither and thither by the currents of the lymph stream. With their rapid increase by the proliferation so characteristic of them, a different state of matters is, however, established. They crowd the spaces, and in time actually expand them, so that sooner or later we have formed those *alveoli* packed with cells which are so often the distinguishing feature of a cancerous growth. Looking to their origin, it will be at once apparent that the walls of these alveoli are really the pressed-out remains of the tissue whose lymph spaces the cancer cells have invaded, and to them the term *stroma* has been applied. At first this stroma contains the blood vessels of the part, but it is also permeated sooner or later by a number of new cells, some of which are small and round, while others are larger and more elongated. These are not cancer cells, but are partly the offspring of the fixed connective tissue corpuscles, and partly migrated leucocytes. They are really inflammatory, and they result from the irritation caused by the presence of the invading cancer cells. As time goes on, the stroma is subjected to more and more pressure, both from the increasing cancer cells and from the fibroid contraction which the above mentioned inflammatory exudate undergoes. The further result of these two factors, namely, the fibrous contraction of the inflammatory products, and the mechanical pressure of the cancer cells, is that the blood vessels in the stroma become obliterated, and very marked degenerative changes are set up. Accordingly, the centre portion of a carcinoma of the breast of some standing exhibits a distinctly fibrous appearance, being whitish in colour and speckled with small yellow spots. These latter are the cancer cells of the alveoli undergoing fatty degeneration from want of proper nourishment. I do not propose to dwell on the importance of these changes from a *curative* point of view, but there can be no doubt that by them the cancer cells have been rendered inert, a most instructive fact. All I would insist on is, that the section of a mammary cancer of some duration shows that one of the agencies by which carcinoma works in removing tissue and replacing it by its own cells, is *mechanical pressure.*

This agency, however, does not to my mind explain all that is seen in connection with the spread of carcinoma. The microscope shows us at the active margins of a growing mammary cancer, not only the acini being pushed aside by the infiltrating cells, but a very rapid disappearance of the epithelium. Not that this is undergoing conversion into cancer cells, for probably such a thing does not happen, but that it is apparently vanishing before the cells of the new growth. The same thing is seen in that glandular implication which is such a marked feature of the carcinomata. If an involved lymphatic gland is examined in an early stage, it will be found that the first manifestation of its being affected is at the *periphery*, in the course of the usual afferent lymph stream. Here will be found arrested groups of malignant cells, which may be showing the varied mitotic appearances of active division and proliferation. If some time is allowed to elapse, a later examination of the same gland will show that it is now composed of nothing but cancer cells, which have made their way in from periphery to centre, and have practically *replaced* the glandular parenchyma and its lymphoid cells with a new growth of malignant tissue. Were observations to be made while this change was in progress, they would show that the glandular lymphoid cells took no active share in it, but that they disappeared entirely in the presence of the cancer cells. It is difficult to grasp that mere pressure can bring about this complete transformation of tissue, and attempts have been made to explain it, as well as the greatly increased vegetative capacity of cancer cells, by ascribing to them the possession of special properties. Thus, Virchow has favoured the existence of a *seminium* or spermatic influence, while others have supported the idea of an *infective fluid* of unknown composition but of great power. All of these suggestions have underlying them the principle that carcinoma spreads by some contagious excretion, which infects the adjoining tissues and practically changes them. I am not prepared to support this view, for, as I have already said, I do not think we have a conversion of epithelial cells into cancer cells, but I certainly hold that cancer cells have the power of acting on adjacent cells, and that this may be explained in another way, and more in keeping with the advances that have been made of recent years, on how cells may influence one another.

Of these advances, the most important as bearing on our subject are those that have been made in connection with the physiology of fermentation, a term that now includes a number of manifold processes, all of which have these two features in common—(1) That they are accompanied by the decomposition of complex molecules, and (2) that they take place, directly or indirectly, through the agency of either vegetable or animal cells. Such cells are known as ferments. When they act *directly*, the chemical changes involved in the process occur only in the presence of the cell itself; when they do so *indirectly*, the changes accomplished are brought about by a fluid which is secreted by the cell, and acts apart from it. This difference in their mode of action has separated the large group of ferments into the two kinds of *solid organised ferments*, better termed ferment organisms, of which yeast is an illustration, and the *dissolved unorganised ferments*, which have been named by Kühne *Enzymes*, and of which pepsin is an example. These soluble ferments are a group of highly complex and interesting organic bodies. The first one to be detected in 1833 was diastase. This was followed by pepsin in 1836; and since then investigations have shown that they are very widely distributed in nature. Present both in animals and plants, they are apparently manufactured within the living organism itself by a metabolism of the proteids of the cells, and they are given off to the outside of the cells as a secretion. As to the mode of action of enzymes, this is not quite definitely settled. It may be by a chemical decomposition of the neighbouring molecules, or it may be by mere *contact*, just as happens in the case of formic acid, which can be broken up into carbonic acid and hydrogen by finely divided metals like iridium and rhodium, the metals themselves undergoing no change in the process.

Be that as it may, enzymes can have a powerful chemic and hydrolytic effect on surrounding tissues, and by their influence they can bring about decomposition and changes in other cells. Further, there is this remarkable point about them, that in doing so they apparently exhibit no change themselves, and thus their activity can be *practically illimitable.* It may be that they are destroyed and are constantly reformed, but the fact remains that they in no way combine with the products of their reaction, so that when a quantity of material has been acted on by a definite amount of an enzyme, at the end of the process the original quantity of the enzyme is found to be the same.

I have for some time felt that whatever be the origin of the first cell or cells that start a carcinoma, the relation of their numerous offspring to the tissues they invade is that of a parasite, in the sense that *they get their nourishment from them.* By saying this, I hope it will not be understood that I support the parasitic theory of the cause of cancer. As I have written elsewhere, I hold the opposite view, and look for the cause of the disease rather within the body than without. But it has always seemed to me that the active and rapid growth of a carcinoma with its vegetative activity, as shown by the quick proliferation of its cells, could only be explained by assuming that the tissues of the affected organism served as *pabulum* for it. The complete disappearance of all the structures invaded by the carcinoma is confirmatory of this view. It is self-evident that cancer cells, if they are animal cells, as I feel sure they are, cannot live on purely inorganic matter, such as water, salts, or other chemical substances, in the same way that we know plants can do; and though they are brought, by means of the blood vessels in the stroma, into contact with that blood plasma which is the common nutrient material for all the tissues, yet it is not an unreasonable assumption that in addition they may be endowed with an extracellular digestion, which will allow of their reducing the solid tissues around them into a soluble form and then ingesting them by resorption. If this be so, I thought that it might be a useful inquiry to ascertain if any *enzyme* existed in cancer cells, and on laying my views before Professor M'Kendrick, in May 1897, he thought that investigations might profitably be conducted in this direction, and he suggested that I should seek the co-operation of his then Muirhead demonstrator, Dr. David F. Harris, whose ability in physiological chemistry rendered him specially suitable for undertaking the work. This I did, and I have here to acknowledge the valuable help and ready assistance I received from him.

I cannot do better than give here the report furnished to me by Dr. Harris.

"In June and July 1897 I received from Dr. Beatson several portions of cancerous tissue excised from the human subject, with the view of inquiring whether there was any evidence of the presence of a ferment secreted by the cells of carcinomatous growth. Dr. Beatson's idea was briefly that the cells of a carcinoma, having the power of steadily invading adjacent tissues, do so by means of some tissue dissolving ferment, presumably secreted by the cells of the tumour. Such a ferment would be of the nature of a proteolytic enzyme.

"I directed that the freshly excised pieces of the cancerous tissue should be at once placed in two to three ounces of Price's pure glycerine, after having been merely rapidly washed in normal saline solution, to remove blood or any other accidental contamination.

"I assume that this enzyme, like the majority of enzymes known to us, was also soluble in glycerine, and therefore followed in principle the method of von Wittich for its extraction. The mass of tissue having lain in the original glycerine for two or three days at the temperature of the room, was then ground up in a mortar in presence of the glycerine in which it had been lying, and of powdered glass or of fine sand, in order to disintegrate it. This was in some cases a matter of extreme difficulty, owing to the extraordinary toughness and denseness of the cancerous mass. The cellular débris, along with the glycerine, sand, or glass, was then scraped into a thin flask plugged with cotton-wool, and kept in a water bath for seven or eight days, at a temperature of about 40° C. After this the contents of the flask were filtered, and any enzyme soluble in glycerine should have been in the filtrate.

"It was assumed that an enzyme such as was being sought for, being proteolytic, would digest such material as washed fibrin from blood-clot. A few shreds of fibrin were therefore placed in the filtered glycerine extract, and kept for fourteen days at 40° C.

"In this manner the following were examined:— 1) Scirrhus of mamma, (2) carcinoma of rectum (male), (3) carcinoma of rectum (female), (4) carcinoma of axillary glands (female), and (5) carcinoma uteri. The results of these "digestion" experiments were in all cases negative. In no flask was there any disappearance of the fibrin, and in no flask was there any appearance of proteose or peptone. Hence, as examined by the glycerine method of extraction, we seem entitled to conclude that the cells of a carcinoma do not secrete a proteolytic enzyme."

Besides, however, this inquiry carried out by Dr. Harris, it seemed to me that in our present uncertainty as to the exact nature of carcinoma, that the possibility of the disease being due to a yeast, as the Italian observers San Felice and others maintain, should be kept in view, and that search should be made for the special enzyme associated with yeast, namely, *invertin* or *invertase,* which has the property of converting cane sugar into glucose (dextrose). This was done for me by Dr. Ernest Fortune, the experiments being carried out as follows:—

Pieces of the tissue under examination were minced in a mortar (previously sterilised) along with a 10 per cent. solution of cane sugar. The mixture was then neutralised with a solution of sodium bicarbonate, and placed in a water bath at a temperature of 50° to 52° C. In certain of the experiments, for antiseptic purposes, the tissue was first bruised in chloroform water (B.P. 1898), and, after standing for twelve hours, the chloroform water was poured off and added to an equal quantity of cane-sugar solution. The tissues examined included scirrhus mammæ, sarcoma, adenoma, breast tissue, and carcinoma of the liver (secondary). In all cases, means were taken to prevent the introduction of bacteria from without.

The cane sugar solution was tested with Fehling's solution at periods varying from two to forty-eight hours, and in only *two* instances was the Fehling reduced. In *ten* other experiments there was no evidence that cane sugar had become inverted. In the *two* instances where inversion occurred, this could be explained by the accidental introduction of bacteria, in some of whom probably invertase may exist.

Negative as these results are, I am not prepared to accept them as final, and the inquiry is still being prosecuted. All investigators into the action of enzymes, and their presence in tissues, have acknowledged the difficulty there is in extracting them from the protoplasm of the cells in which they are known to exist. It is possible that the portions of cancerous tissues used were of too long growth, and that the contained cells had undergone that fatty degeneration which, I pointed out, occurred in the centre of old mammary cancers. It may also have happened that sufficient time had not been given for the extraction of the enzyme. Both these points will require attention in future. The difficulties in the carrying out of the inquiry are, I know, great, not only because of our not having that chemical knowledge of enzymes which will allow of a definite precipitant being used, but also because of the small quantities of them which are generally present. Another factor that has to be reckoned with in such observations, is the possible presence of *bacteria* in the tissue experimented on. This would certainly be a disturbing element, for there are many enzymes secreted by micro-organisms, an everyday illustration of which is seen in the liquefaction of gelatine by certain bacteria. Cancerous tissue that has ulcerated is specially liable to this fallacy.

Difficult though it may be to isolate any enzyme in cancer cells, I am of opinion that there are grounds for continuing the search. With the presence of one or more enzymes established in cancerous growths, a great deal in connection with the carcinomata that otherwise seems unaccountable would be explained. Thus it would, I consider, clear up those variations in the rate of progress of cancer that are seen in different individuals and at different ages, for then would come into play that resisting power of the tissues which depends on their suitability, or otherwise, to serve as pabulum for the advancing cells. If they do not yield easily to the digestive action of the cancer cells, then the disease will be slow, for the new growth must suffer from want of nourishment, and its cell proliferation will accordingly be lessened. On the other hand, if the tissue cells are easily assimilated, then the growth will be strong and vigorous, just as happens in the liver and submaxillary glands, where the glycogen present furnishes abundance of nutriment, and the secondary manifestations of the disease that occur there often assume most striking dimensions. From a therapeutic point of view, also, it will be readily seen an enzyme would be of great assistance to us, as it might allow of medicine coming to the help of her handmaid surgery, and possibly supplementing local removal in such a manner that a more permanent cure might be relied on. The pathological chemistry of carcinoma has not been perhaps sufficiently worked out, and when we are awakening to the fact that nearly all the metabolism and tissue changes in the body are really local fermentations,—in fact, that this body of ours is practically a ferment organism which daily transforms quantities of food-stuffs, and yet only slowly and imperceptibly disappears itself,—it is not unreasonable to surmise that cancer cells, even though they may be cells that have "gone wrong," are still subject to the laws of nutrition that hold good elsewhere.

BACILLUS TYPHOSUS AND BACILLUS COLI COMMUNIS: A CRITICAL COMPARISON, WITH SOME DESCRIPTION OF A NEW METHOD FOR THEIR DIFFERENTIATION, AND ITS APPLICATION TO THE DIAGNOSIS OF TYPHOID FEVER.

By Robert William Mackenna, M.A., M.B., Ch.B., *Dumfries*.

In the great kingdom of the micro-organisms there are no two which resemble each other so closely as the *Bacillus typhosus* and the *Bacterium coli commune*.

In fact, so many striking points of similarity exist between them, that no less authorities than Rodet and Roux[1] have committed themselves to the opinion that the pair are simply varieties of the same species—the *B. coli communis* being capable of development into the *B. typhosus.*

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[1] *Deutsche med. Wchnschr.*, Leipzig, 1891, S. 1416.

This is an idea to which many facts lend support, for it is a commonplace in bacteriology that one can so modify an organism in a short time, and through a few generations, by cultivating it at different temperatures on various media, that the most marked specific characters can be weakened and altered. But upon the discussion of this interesting theory we do not propose now to enter. It shall rather be our aim in this paper to compare the two organisms fully, to give in detail the various methods that have been employed to distinguish them, to point out their fallacies, to describe a new and simple procedure by which they can be readily distinguished, to record some experiments performed personally with this new method, and to indicate its applicability to the diagnosis of typhoid fever.

We shall naturally begin our comparison with a consideration of the morphology of the two organisms.

The *B. typhosus*, or, as it is often called, Eberth's bacillus, is a short rod from 1–3 μ in length. The ends are rounded. The breadth of the organism is commonly about one-third of its length. It is usually seen singly or grouped in pairs. The above is the classical description, but many conditions may produce deviations, and one frequently meets with the typhoid bacillus in the form of long filaments, or in short, stumpy, and coccal forms. Malvoz has described aberrant types that resembled in size the *B. anthracis*, while spindle-shaped and boat-like forms have also been described.

These are all varieties found in actively growing cultures; but involutionary forms from old cultures often show an increase in length and thickness, and an irregular massing of the protoplasm that was formerly mistaken for spore-formation.

In morphological character the colon bacillus has nothing to distinguish it from the typhoid bacillus. Its dimensions also are extremely variable, but in length, breadth, and general configuration, it may be said to correspond almost identically with the organism of typhoid. The arrangement is usually single, but may be in pairs. Even in recent cultures it may be met with in ovoid and coccal forms, or in short and long filaments (Renault).[1]

SPORES.—For a time the question of the existence or non-existence of spores in these two organisms was much debated. In 1887, Birch-Hirschfeld stated that he had observed spores in *B. typhosus* cultivated at 37° C., and in the same year Chantemesse and Widal[2] pledged themselves to the same belief. These so-called spores were usually found at the extremities of the rods, and were not met with in cultures grown at a lower temperature than 37° C. This discovery found considerable support, and this new feature was regarded as an essential mark of distinction between the *B. typhosus* and the *Bacterium coli*. But shortly afterwards the same appearances were seen to be frequently present in the *B. coli communis*, and it was then recognised that these were not spores in a true sense, but simply little aggregations of protoplasm.

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[1] "Manuel de médecine," tome ix. p. 95 *et seq.*

[2] "Recherches sur le bacille typhique," *Arch. de physiol. norm. et path.*, Paris, 1887.

Leo Müller, however, made a special study of these protoplasmic aggregations, and believed that their appearance and arrangement was really peculiar to the *B. typhosus*. He found that they appeared best in typhoid bacilli grown on potato, naturally acid or rendered artificially so. They were usually evident at the end of twenty-four hours, but appeared in their most typical form after three to six days' cultivation. These little protoplasmic aggregations stained well. The *B. coli communis* never gave such typical appearances when cultivated under the same circumstances, but showed only irregularly situated vacuoles. It is self-evident that such a trivial distinction, if it really existed, would be of little value for the differentiation of the two organisms, and the probability is that the forms described by Müller were simply involution forms.

CILIA.—In 1889, Löffler,[1] by means of a special staining process, showed that the *B. typhosus* possessed cilia. They are arranged usually at the ends and along the sides of the germ. They are fragile and wavy, and easily separated from the bacillus. In number they vary from eight to twelve, but as many as twenty-four have been seen attached to one germ. Commonly they are three or four times the length of the germ to which they belong. They do not stain readily with aniline dyes, and their demonstration demands a preliminary treatment of the preparation with a mordant. For some years after the flagella of the typhoid bacillus had been recognised, their possession was denied to *B. coli communis*. Lucksch,[2] however, pointed out that *B. coli communis* also had flagella. At first it was believed that the arrangement of the flagella on the latter organism was different to that on the *B. typhosus;* but repeated observations, and especially those of Dunbar, forced bacteriologists to the conclusion that no essential distinction could be drawn between the disposition of the flagella on the two microbes. It has been said that the flagella attached to the colon bacillus are less numerous, shorter, more delicate, and more difficult to stain than those of Eberth's bacillus. But on the first point no stress can be laid, since the number of flagella one can bring into view depends on so many factors, *e.g.* the age of the culture from which the preparation was taken, the nature of the culture medium, the composition of the mordant employed in the staining process, the kind of dye, the degree of heat applied, and the manipulative dexterity of the stainer. Further, Bunge[1] says that when stained with his medium, the *B. coli communis* often shows more flagella than the typhoid organism. The mere number, therefore, of the flagella ceases to be a valid point for distinguishing the two germs, and he would be deficient in the veriest rudiments of scientific common-sense who would venture to distinguish the two bacteria from such trivial criteria as the length and delicacy of their cilia.

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[1] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, Bd. vi. S. 909.

[2] *Ibid.*, 1892, S. 430.

MOTILITY.—In virtue of their flagella, both microbes are motile. Their movement has been finely analysed into two parts—a movement on their own axis, and a movement of progression. Usually the movement of *B. coli communis* is more sluggish than that of *B. typhosus*, but we have seen bacilli of both kinds, grown under precisely the same conditions of media, temperature, and time, which really showed no appreciable difference in motility. As can be easily understood, the motility depends on many considerations, and little value pertains to it as a separating characteristic.

STAINING.—The two germs agree in that both are easily stained by aniline dyes. To render their cilia evident, however, a special process is required.

In considering the cultivation of the two organisms, we shall begin by studying their relations to fluid media, and the changes they produce therein, and then pass on to consider the growth on solid media.

CULTIVATION *in milk.*—Both the bacillus of Eberth and that of Escherich (*i.e.* the colon bacillus) grow well in sterile milk. The typhoid bacillus is generally believed to multiply in the milk without producing any observable changes in it (even when the culture is heated), while the colon bacillus soon produces a firm coagulum. This result is due to the property of fermenting lactose, which, as we shall see later, the *B. coli communis* possesses. Considerable diagnostic value is attached to the effects of the two bacteria in milk, but one must remember that colon bacilli, whose vitality has been attenuated, lose in some measure this power of producing coagulation.

In bouillon.—At a temperature of 37° C. both the bacilli multiply rapidly in neutral or alkaline bouillon. As a result of this process, the bouillon in both instances becomes turbid, and now and then a superficial delicate pellicle has been observed to form. If the vessels containing the cultivations are kept for a time at a lower temperature, so that the rapid multiplication of the germs is suspended, the organisms form a sediment, and the liquid becomes clear. But, according to Chantemesse, in the case of the *B. typhosus* the fluid does not lose its turbidity for some weeks, and when it does it retains a reddish hue.

The above phenomena occur when the organisms are grown in the ordinary bouillon of bacteriological use; but many varieties of broth have been employed to aid in distinguishing the one microbe from the other. Cesaris-Demel believed he got characteristic results from the growth of the two germs in a bouillon made of calves' liver. Grown in this medium for three or four hours, at a temperature of 37° C., the colon bacillus brings about, he says, a fermentation and a cloud-like opacity of the medium which persists for a day or two. On the other hand, *B. typhosus* fails to produce any fermentation, and the opacity that attends its growth is dust-like.

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[1] *Fortschr. d. Med.*, Berlin, Bd. xii. No. 17.

Inghilleri announced to the International Medical Congress at Rome in 1893, that *B. coli communis* acted like *emulsin* in a broth to which *amygdalin* had been added—breaking up the *amygdalin* into hydrocyanic acid and benzolaldehyde. This property, he stated, was not possessed by *B. typhosus;* but in the literature of the subject I can find no further reference to the question, and in bacteriology isolated observations must always be accepted with reserve.

Schild[1] gives the results of some experiments in the cultivation of the two microbes in broths containing slight traces of formalin. He found that in a formalin broth containing formalin in the proportion of 1 to 13,000, the typhoid bacillus could not develop; while the colon bacillus could grow actively in a formalin broth where the ratio was 1 to 4000. Abel,[2] however, showed that this supposed method for the differentiation of the two microbes was useless, for of fifteen varieties of *B. typhosus* with which he experimented, some behaved towards formalin exactly like the *B. coli communis,* while others showed that sensitiveness in its presence which Schild had observed.

Indol reaction. — Considerable diagnostic value has been attached to what is known as the indol reaction (Kitasato).[3] The practical details for the demonstration of this reaction may be found in any good text-book of bacteriology, and their repetition here is outside our province. Suffice it to say that the reaction is given by cultures of the colon bacillus and not by typhoid cultures. Though much importance has been attached to the indol reaction as a means of distinguishing the two organisms, it seems as though it were beginning to lose weight, for Chantemesse[4] has pointed out that the addition of acid reagents to old cultures of *B. typhosus* produces a reddish colour, not unlike that elicited from cultures of *B. coli communis* by the indol reaction. Further, Baginski has failed to discover indol in the products of the growth of *B. coli communis* cultivated in peptonised bouillon to which lactose has been added; while, on the other hand, Morris[1] states that he has found indol in cultures of the *B. typhosus* grown for ten days at 37° C. in peptone bouillon. It has also been found that *B. coli communis*, cultivated in broths containing antipyrin, loses in some measure its indol-producing faculty, and carbolic acid broths seem to inhibit entirely this property, though this is a point much debated.

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[1] *Ztschr. f. Hyg.*, Leipzig, Bd. xvi. S. 378.
[2] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1894, S. 1041.
[3] *Ztschr. f. Hyg.*, Leipzig, Bd. vii. S. 515.
[4] *Ann. de l'Inst. Pasteur*, Paris, 1892, p. 513.

Refik[2] succeeded in isolating from the waters of the Bosphorus five undoubted types of *B. coli communis*, none of which gave the indol reaction. The reaction would therefore seem to be a "separable accident," and Rodet and Roux insist that only slight value should be attached to this property for purposes of differential diagnosis.

Sugared bouillons.—The cultivation of the two organisms in bouillons to which various sugars have been added, has opened up a wide field of research, the experiments in which have yielded interesting results. Th. Smith[3] pointed out that *B. typhosus*, when growing in a glucose bouillon, fermented the sugar, producing no gas, while the *B. coli communis* produces it in large quantity. But Dubief[4] showed that both the organisms brought about in sugar media the formation of ethyl-alcohol, carbonic acid gas, acetic, butyric, and lactic acids. Blachstein of St. Petersburg has also shown that by cultivating the *B. typhosus* in a glucose medium, which has been kept in a thermostat for three weeks, at a temperature of 37°–40° C., small quantities of lactic acid are produced. One cannot, therefore, rely upon cultivation in glucose media for definite and distinguishing results.

Lactose is another of the sugars with which experiments have been made. Chantemesse and Widal[5] added to bouillon 2 per cent. lactose and 1 or 2 grms. of sterilised calcium carbonate. The medium was then inoculated with the two organisms, and put in the incubator at 37° C. After a few hours the development of gas bubbles was seen in the culture of *B. coli communis*, while in that of *B. typhosus* no gas could be discerned.

Roux states that, if the lactose is very pure, the fermentative process produced by the typhoid bacillus is exceedingly slight, and insufficient to bring about the disengagement of bubbles of gas. On the other hand, *B. coli communis* ferments lactose rapidly, and disengages gas in great quantity. The gas liberated is chiefly carbonic acid gas and hydrogen, and the fermentation may go on till the lactose is completely used up. Both of the germs seem to ferment galactose, and Chantemesse and Widal state[6] that *B. coli communis* ferments lactose, saccharose, glucose, rhamnose, maltose, glycerine, erythrite, and mannite, but not starch or glycogen. *B. typhosus* is said not to ferment cane sugar; *B. coli communis*, however, if young, has this power, but it frequently loses it.

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[1] *Arch. f. Hyg.*, München u. Leipzig, Bd. xxx. S. 309.

[2] *Ann. de l'Inst. Pasteur*, Paris, 1896.

[3] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, Bd. vii. S. 504.

[4] *Deutsche med. Wchnschr.*, Leipzig, 1891.

[5] *Bull. méd.*, Paris, 1891, p. 935.

[6] *Loc. cit.*

Dieudonne[1] has employed a solution of 1 per cent. peptone water, to which he adds $\frac{1}{10000}$ per cent. potassium nitrate. Both bacilli grow in this medium, and liberate nitric acid, whose presence may be shown by adding sulphanilic acid and naphthalin, when a red colour appears. The fluid in which the *B. typhosus* is, does not give this reaction till after seventeen hours' incubation at 37° C., while the *Bacterium coli* gives it distinctly after four hours, but loses it later, and does not show it at the end of seventeen hours.

In mineral waters.—Experiments have been made to ascertain how the two bacteria would behave in certain artificial mineral waters (*Minérales de Nægeli*), where there was no constituent present not absolutely essential to the growth of the germs. In these waters it was found that the colon bacillus developed actively, while *B. typhosus* remained dormant. But there are not lacking observers who question this result.

In urine.—In the quest for a medium that will give definite and distinct growth differences between the two organisms, few things have been passed over by the investigator. It is not, therefore, astonishing to find that a solution of the problem has been sought from cultivating the two germs in urine. Sydney Jamieson[2] is reported to have found that, if one inoculates tubes of healthy sterile urine with *B. coli communis*, and other tubes with *B. typhosus*, and incubates them at 37° C., the urine in the former instance undergoes ammoniacal decomposition in a few days, while in the latter it remains unchanged. Confirmation of this observation is still required.

CULTIVATION ON SOLID MEDIA.—*Potato.*—Typically there are considerable differences between the growths of the two organisms on potato. The classical picture of the potato culture of *B. typhosus* is as follows: After forty-eight hours' incubation at 37° C., one generally sees a humidity along the surface of the potato where the inoculation has been made. The Germans call it *ein unsichtbares Wachsthum*, and often one has to vary the angle of incidence of the rays of light before one can really appreciate the moist appearance. The growth is quite colourless and exceedingly thin, but if one draw a needle over it one receives the impression of a tough resisting pellicle. The colon bacillus grows on potato as a thickish coat, at first clear yellow, but passing through a gradation to dirty brown and yellowish green (*purée de pois*). According to Roux, however, the *B. coli communis* may also develop on potato like the typhoid bacillus, giving a mere moist glaze to the inoculated surface; and the same author states that *B. typhosus* sometimes produces a thick, yellowish, and easily perceived pellicle on potato.

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[1] *Arb. a. d. k. Gsndhtsamte.*, Berlin, Bd. xi. S. 508.

[2] *Brit. Med. Journ.*, London, 1899, vol. i. p. 452.

Belfanti[1] reports that he cultivated six varieties of *B. typhosus*, from various sources, on three different kinds of potatoes. In only two cases did he get the moist, colourless growth which is regarded as characteristic. The other bacteria grew like *B. coli communis*, producing a visible integument whose colour varied between yellowish white and greyish yellow. In addition to this, there is an increasing amount of evidence to show that the diagnostic value of potato cultures has been greatly over-estimated.

We shall consider Elsner's medium (a gelatine medium to which a potato extract has been added) after we have passed the gelatine cultivations under review.

On eggs.—Eggs make a bad culture medium, since they are rarely sterile. However, the following experiments of Alonzo are not without value. He found that—

1. *B. coli communis*, when introduced into fresh eggs, brings about the evolution of a large quantity of gas. *B. typhosus* does not do this to such a degree.
2. After it has grown for fifteen to twenty days in eggs, the *B. typhosus* loses its typical form; while the *B. coli communis* retains its form for a much longer time.
3. On hard-boiled eggs the *B. coli communis*, if implanted on the albumin, produces a beautiful, pale, brown stain, and in the yolk a dark spot, which spreads.

On the white of the egg, as also on the yolk, *B. typhosus* gives rise to a colourless spot, which appears much later than that produced by *B. coli communis*, and does not spread.

Of these conclusions we can find neither confirmation nor denial.

In gelatine.—On the ordinary gelatine medium of the bacteriological laboratory the two organisms develop, whether in stab, stroke, or plate cultures, in such a way as to be practically indistinguishable.

Chantemesse and Widal have, however, stated that if one make a stroke culture of the typhoid bacillus on gelatine, and then scrape the culture away, a fresh inoculation of *B. typhosus* on this surface will not germinate; while, on the other hand, if one inoculate *B. coli communis* on this surface, it grows, though not so vigorously as on virgin gelatine.

Though the results obtained from cultivating the two germs in gelatine alone are practically valueless for diagnostic purposes, Elsner's medium, a medium composed of gelatine and an extract of potatoes, to which potassium iodide has been added, gives interesting results.[2]

Plate cultures of *B. coli communis* on this medium show, at the end of twenty-four hours, little brown, finely-granular colonies; while the *B. typhosus*, still invisible at the end of twenty-four hours, exhibits in forty-eight hours delicate little colonies which look like drops of water in the gelatine. Elsner's medium has been much employed by Sterling[1] and Brieger in the examination of typhoid stools for the typhoid organism.

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[1] *Riv. gen. ital. di clin. med.*, Pisa, 1890.

[2] *Ztschr. f. Hyg.*, Leipzig, Bd. xxi.

On a gelatine medium containing a decoction of malt, a stroke culture of *B. typhosus* appears as a thin white line with a fairly even edge, while *B. coli communis* develops more vigorously, and forms a thick, extensive, creamy coating with irregular edges.

On agar-agar.—On agar-agar, stroke cultures of typhoid bacillus appear as a thin white streak, while *B. coli communis* forms a dirty greyish streak whose development is more vigorous than that of *B. typhosus.*

On lactose-agar which contains 4 per cent. lactose and 1–4 per cent. peptone, the *B. typhosus* forms, after twenty-four hours' incubation at 37° C., colonies which are recognisably much smaller than those of the *B. coli communis* grown under the same circumstances (Hellström).

On blood serum *B. typhosus* grows only in relation to the line of inoculation as a faint milk-white streak. *B. coli communis*, on the other hand, forms a white stroke.

COLOUR MEDIA.—A large number of media, with agar for their basis, which give colour reactions as a result of the cultivation of one of the germs, has been employed for differentiating them.

The chief of these is Wurtz's medium,[2] which contains agar, lactose, and litmus. In virtue of the litmus it contains, the medium is blue. Round colonies of *B. typhosus* the blue colour persists, while the lactic acid generated by the zymogenic action of the *B. coli communis* on the lactose causes the medium to assume a red colour round these colonies.

Gaser[3] recommends an agar medium coloured with a drop or two of an aqueous solution of fuchsin. *B. coli communis* rapidly decolorises this medium, while *B. typhosus* does not. If, however, the agar is old, both germs bring about decolorisation, though not in the same degree.

Marpmann[4] has also made experiments with coloured agar-agar. He found that on an agar medium stained with malachite green and decolorised with sodium sulphite, the *B. typhosus* produced a dark green pellicle, while a culture of *B. coli communis* appeared greyish white. On agar, coloured with indolin or nigrosin, he found that *B. typhosus* at first produced a humidity in the area of inoculation, without any coloration. After eight to ten days, however, a whitish grey pellicle is produced. *B. coli*

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[1] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1897, S. 334.

[2] *Bull. méd.*, Paris, No. 100, p. 1155.

[3] *Semaine méd.*, Paris, 1891, No. 31.

[4] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, Bd. xvi. S. 817.

communis grows much more rapidly, and in a few days forms a thick whitish growth. Ramond has also obtained striking results with an agar medium stained with rubine acid.

RELATIONS TO TEMPERATURE.—In this respect practically no difference exists between the two organisms. Both grow well at ordinary temperatures, but rapidly die if exposed to high temperatures. In bringing to a conclusion our consideration of the growth of the two organisms on various media, we may state that practically on all media, given similar temperature conditions, the *B. coli communis* develops more rapidly than the *B. typhosus*. Of the serum test for distinguishing the two organisms—which is within the common knowledge of every student of pathology—there is no necessity to speak here. We have now passed under review all the well-known (and some of the less-known) methods that have been suggested from time to time for the solution of this vexing problem—the separation of *B. typhosus* from *B. coli communis.* We have seen that a very large number of the methods proposed were obviously useless, as they depended on exceedingly variable attributes of the organisms. Other methods, that for a time were recognised as infallible, were proved by later experiment to be uncertain and fallacious. Whether the method that remains to be described will stand the test of time, it is impossible to say, but at present it seems to hold out good promise. It may safely be postulated that no single one of the methods already enumerated would to-day be regarded by any careful bacteriologist as sufficient in itself to differentiate the two bacilli.

The most reliable distinctions are summarised herewith:—

1. Movement.—*B. typhosus* active; *B. coli communis* more sluggish.—A bad distinction.
2. Growth in sterile milk.—*B. typhosus* fails to produce coagulation; *B. coli communis* succeeds.
3. The indol reaction.—Obtained in cultures of *B. coli communis;* absent from those of *B. typhosus.*
4. Growth in sugared bouillons.—*B. typhosus* does not ferment the lactose.
5. Growth in mineral waters.—*B. coli communis* develops well, while *B. typhosus* hardly develops at all.
6. Growth on potatoes.—"Invisible" growth of *B. typhosus*, as compared with the recognisable pellicle produced by *B. coli communis.*
7. On a gelatine surface, where *B. typhosus* has already grown, one cannot get another culture of the same organism to grow, while *B. coli communis* will develop.
8. On maltose gelatine a culture of *B. typhosus* appears as a white line with a fairly regular border, while *B. coli communis* forms a creamy coating with irregular edges.

9. The results of growth in colour media.—(*a*) Lackmus agar retains blue colour with *B. typhosus*, and assumes reddish hue with *B. coli communis.* (*b*) On agar, with malachite green, where the colour has been discharged, *B. typhosus* grows as a dark green pellicle, while the culture of *B. coli communis* appears greyish white. (*c*) Agar, lactose, and rubine acid,—with colour discharged,—*B. typhosus* produces no change in colour, while the *B. coli communis* brings back an intense red.

10. The serum test.—"Typhoid serum" agglutinates the *B. typhosus*, and leaves the *B. coli communis* usually unaffected.

For the successful differentiation of the two organisms, any three (not less) of the above methods may be taken as sufficient.

The reason of the great difficulty that exists in distinguishing between the bacillus of Eberth and that of Escherich lies in the fact that both are *living* organisms, probably closely allied in the first instance, and extremely susceptible to their environment, which can produce great modifications in both of them. It is not, therefore, remarkable that we have varieties of *B. typhosus* which approximate in character closely to *B. coli communis*, and, on the other hand, varieties of *Bacterium coli* which closely resemble the typhoid bacillus.

Refik[1] treats of five different types of *B. coli communis*, none of which possessed *in toto* the classical attributes of the colon bacillus, while some of them closely resembled the *B. typhosus.* A. A. Orlowski[2] goes the length of recognising no fewer than eleven different varieties of the *B. coli communis*, which descend from the ground type to a variety very like the typhoid bacillus, and the literature contains many records of such approximations.

A study of the distinctions already enumerated will show that most of the characters of *B. typhosus* are negative, while those of *B. coli communis* are positive. Thus, *B. typhosus* does *not* coagulate milk; it does *not* produce a visible growth on potato; it does *not* produce indol, and so on. For purposes of differentiation, one positive quality is worth a hundred negative ones, but unfortunately the positive qualities of the typhoid bacillus are few. Besides, none of these methods, with the exception of the serum test, are of any practical use in the diagnosis of typhoid fever, and none are of any value in separating the two bacilli in water. Indeed, Roux[3] goes the length of saying —"At this time (1896) bacteriologists are almost unanimous in saying that it is absolutely impossible to discover, by known and usual procedures, the presence of the bacillus of Eberth in media (water, fæcal matter, pus, etc.) where the bacillus of Escherich is at the same time present." This sweeping statement is, we think, rather weakened by what is to follow.

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[1] *Ann. de l'Inst. Pasteur*, Paris, 1896.

[2] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1897, S. 134.

[3] Bouchard, "Traité de pathologie générale," tome ii. p. 557.

Piorkowski[1] reports on a new method for the differentiation of the two bacilli, by growing them on a urine-containing medium.

The medium is prepared as follows:—Normal urine of sp. gr. 1020 is kept for two or three days till it assumes the alkaline reaction. It is then mixed with ½ per cent. peptone and 3·3 per cent. plate gelatine, boiled for an hour in a water bath, and then filtered without its temperature being allowed to fall. The mixture is then poured into test tubes, which are plugged with cotton-wool in the usual way, and sterilised by being heated on the day they are filled to 100° C. for fifteen minutes, and on the follow-day for ten minutes more. On this medium Piorkowski claims that both in stab cultures and in plates the bacillus of Eberth and that of Escherich may easily and accurately be distinguished. Stab cultures of the *B. coli communis* appear in this medium, he says, as a firm whitish grey streak with a broad superficial growth, while similar cultures of *B. typhosus* remain brighter and more transparent, are very granular, and *show absolutely no superficial growth.*

In plate cultures the colonies of *B. coli communis* appear (after an incubation of about twenty hours at 22° C.) under a low magnification, as rounded, yellowish, finely granular, and sharp bordered; while the colonies of *B. typhosus* are colourless and have an irregular periphery with threadlike processes radiating from their centres.

The discoverer of this medium has tested its value in the diagnosis of typhoid fever, and believes that it has considerable worth, as it reveals the presence of typhoid bacillus in the stools in a way which permits of no confusion with the perennial host of the human intestine—the *B. coli communis.*

Being interested in the subject of the differentiation of *B. typhosus* from the colon bacillus, we determined to make some experiments with this new medium. For the purpose of these experiments we employed cultures of the two bacilli that had grown on various media—normal fæces and fæces from patients believed to have typhoid fever.

In all the experiments in which direct inoculation of tubes or plates were made with *B. coli communis* or *B. typhosus*, the identity of the mother cultures had been tested by (1) growth on potato, (2) growth in milk, (3) the indol reaction.

The first two cultures used were stock cultures on ordinary gelatine of *B. typhosus* and the colon bacillus.

Experiment 1.—At 1.30 p.m. we inoculated (by stabbing) two tubes of urine gelatine with *B. typhosus* and *B. coli communis* respectively, and also prepared two plate cultures. The plate preparations were set aside for an hour to cool and fix, and were then introduced into the incubator, whose temperature was kept at 20° C. The tubes had already been placed, immediately after inoculation, in the same place.

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[1] *Berl. klin. Wchnschr.*, 1899, No. 7.

At 1.30 P.M. the following day the tubes and plates were taken out and examined. The stab cultures in the urine gelatine were very faintly visible, and the examination of the plate cultures under a low magnification showed little rounded specks beginning to develop. These specks were more evident in the case of the *B. coli communis* than of *B. typhosus*. The tubes and plates were again returned to the incubator. Six hours afterwards the preparations were again examined.

The stab cultures in the urine gelatine were distinctly visible, though not absolutely distinguishable from each other. The plate inoculated with *B. coli communis* showed numerous rounded, yellowish, finely granular colonies, with sharp peripheries; while that inoculated, with the typhoid bacillus showed greyish white colonies, rounded or oval, with feathery processes radiating from them into the surrounding gelatine. Each colony had at least one process, some had quite a number, and presented a spider-like appearance. The distinction between the two kinds of colonies was most striking, and there could be no risk of confusion.

At the end of forty-four hours the stab cultures were beautifully typical. *B. coli communis* appeared along the needle track as a grey streak with a very finely toothed border, and a ragged superficial growth of considerable expansion.

B. typhosus also appeared as a grey streak, but of a lighter hue; the streak was broader and more granular than in the case of the colon bacillus, its margin was more toothed, and there was absolutely no surface growth beyond the point of the needle's entrance. At a glance one could distinguish between the two cultures.

The above experiment was repeated with specimens of *B. typhosus* and *B. coli communis* that had previously been cultivated on potato, on agar-agar, and in milk. In all these instances the results obtained harmonised complètely with those described.

EXPERIMENT 2.—The purpose of this experiment was to ascertain if a plate inoculated with a mixture of *B. typhosus* and *B. coli communis* would show the colonies of the two organisms in such a way that they could be distinguished. A tube of ordinary gelatine was taken and melted; and after it had been allowed to cool slightly a sterilised looped wire was passed into a culture of *B. typhosus* and then shaken briskly in the tube of melted gelatine. *B. coli communis* was introduced into the liquid gelatine in the same way, and the tube was vigorously shaken—its temperature being kept all the while above the melting point of the gelatine, in order that the bacilli might become well scattered through the medium. A tube of urine gelatine was then melted, and by means of a sterile platinum wire the urine gelatine was inoculated with two dips from the tube containing the mixture. A plate preparation was then made with this urine gelatine; the plate was set aside for an hour to cool, and was then placed in the incubator at 22° C. After thirty hours' incubation, one had a striking demonstration of the beauty of the method, for one saw distinctly the rounded, finely granular, yellowish colonies of *B. coli communis*, with their definite margins, while beside them the colonies of *B. typhosus* showed up as silvery grey specks, smaller than the colonies of *B. coli communis*, with irregular edges and finger-like silken processes shooting out into the adjacent gelatine.

Experiment 3.—A tube of urine gelatine was inoculated with fæces from a healthy human adult, and a plate prepared from it. After incubation at 22° C. for thirty hours, one saw numerous colonies, resembling in every respect the typical colony of *B. coli communis* on urine gelatine, and no colony that at all resembled a typical typhoid colony in the same medium.

Experiment 4.—A small piece of fæcal matter from a healthy human adult was mixed with a tube of ordinary melted gelatine, and this tube was then inoculated with *B. typhosus* from an agar culture of the organism. With the contents of the tube a plate was then prepared, and after thirty hours' incubation one could easily distinguish the colonies of the *B. typhosus* and the *Bacterium coli commune* by the characters already enumerated.

From this it was an easy transition to experimenting with "typhoid stools." We have had opportunity of examining stools from five patients suspected of having typhoid fever. In two of the cases the illness was about the eighth day; in two more the duration of illness was uncertain; and in the other the patient had been ill fourteen days. When the experiments were made, we did not know whether Widal's reaction had been obtained with the patient's blood serum or not, but we learned that afterwards.

The Method Adopted.—Three tubes (A, B, and C) of urine gelatine were employed in each case. The gelatine was melted, and a small piece from the suspected fæces was introduced into tube A, and mixed thoroughly with its contents. Into this first tube a sterilised platinum needle was thrice dipped, and introduced each time into tube B, where it was briskly shaken. From tube B six dips were conveyed in a similar way into tube C. From tubes B and C plates were then prepared, and incubated as before described.

At the end of thirty hours one could distinctly and easily differentiate the colonies of *B. typhosus* from those of *B. coli communis*. It was interesting to note that the colonies of *B. typhosus* and those of *B. coli communis* appeared smaller in plates prepared from typhoid fæces, where both bacilli are present, than in plates inoculated simply with one or other of the bacilli. This fact would lead one to suppose that there is a process of mutual inhibition at work when the two bacilli grow simultaneously in the same medium.

The results of our experiments with typhoid stools were as follows:—

In two cases no colonies appeared that resembled in the slightest degree those of the *B. typhosus* in urine gelatine. (We afterwards learned that Widal's reaction had not been obtained in either of the cases from which the fæces came.) In the other three cases one was able at a glance, under a magnification of

80 diameters, to recognise the presence of the small, irregularly shaped colonies of the typhoid bacillus with their silken fingers, side by side with the larger, rounded, regular colonies of *B. coli communis.* In these three cases Widal's reaction was positive. Some of the plates showed many colonies of the *B. typhosus;* others comparatively few. It would be interesting to know if there is any relation between the number of typhoid colonies one gets in a culture from the stools, and the severity or mildness of the case. It is quite possible the two facts are interdependent, but on this we have no definite knowledge. Probably the stage of the illness will influence profoundly the number of the bacilli in the stools.

From the results of the above experiments one may reasonably conclude that this new method will prove of the greatest value, not only for differentiating the one bacillus from the other, but also in confirming the diagnosis of typhoid fever.

It is a method that so far has given uniform results, and results which are sufficiently striking to be appreciable on a first glance. No one could fail to distinguish between the "stab" or plate cultures of the two bacilli; and, what is most important, the method is one whose employment is easy. Widal's reaction is obviously useless for the practitioner whose lot is cast in remote country districts; but it would be a simple thing for him to keep by him, till need required, a stock of urine gelatine, and correct or confirm his diagnosis in all cases of prolonged or obscure diarrhœa by making a plate culture from the fæces.

The discovery of this medium opens up quite a new field in the diagnosis of enteric fever. Roux[1] says that one must give up expecting to find in typhoid stools, except in exceptional cases, anything else than the bacillus of Escherich (*i.e.* the colon bacillus). This is a view that has been very generally accepted, and Karlinski,[2] Nicolle and Wathelet,[3] and Sterling,[4] have all emphasised the rarity with which *B. typhosus* is met with in typhoid fæces. This seeming infrequency of occurrence has evidently been due to the lack of a medium in which *B. coli communis* and the typhoid bacillus would readily grow side by side.

There is still opportunity for any one who has the patients at his disposal, to investigate what is the earliest date in the illness at which *B. typhosus* is recognisable in the stools. But uncertainty as to this fact does not interfere essentially with the diagnostic value of this method; for the bacilli would seem, as a rule, to be recognisable in the stools at the end of the first week. Widal's reaction is, according to himself, first certain on the seventh or eighth day of the illness, and evidently the typhoid bacilli are in the stools by this date, so the two methods, Widal's and Piorkowski's, may be used simultaneously as powerful adjuvants of one another. In those cases where, for unascertained reasons, Widal's reaction is uncertain and unsatisfactory, experiments on the stools with the urine gelatine medium should leave no doubt as to the diagnosis.

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[1] Bouchard, "Traité de pathologie générale," tome ii. p. 563.

[2] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, Bd. vi. S. 65.

[3] *Ann. de l'Inst. Pasteur*, Paris, 1895.

[4] *Centralbl. f. Bakteriol. u. Parasitenk.*, Jena, 1897, S. 334.

SOME POINTS OF INTEREST IN THE MORBID ANATOMY OF THE AORTIC VALVE.

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(PLATES V. AND VI.)

THERE are a few points in connection with the morbid anatomy of the aortic valve which may possibly not be of any great practical importance, yet one ventures to think are sufficiently definite to merit more attention than has been given to them.

The first point which seems to me to be in some degree overlooked is the connection between aortitis and disease of the segments of the aortic valve. It has been a widely accepted opinion, that aortitis of the aorta just above the valve may cause dilatation of the aortic orifice, and occasion regurgitation, while the aortic segments remain healthy. Some observers of authority have doubted the truth of this opinion, but Newton Pitt has placed the existence of this cause of regurgitation upon a firm basis, by bringing several cases of the kind before the Pathological Society of London.[1]

It is not, however, to this sequence of aortitis I wish to refer, but to the deformity of the aortic segments, caused by their becoming involved in the inflammation of the aorta. Although this downward spread of aortitis does not appear to be by any means uncommon, a cursory glance at various text-books of medicine failed to discover any definite mention of the association of disease of the aorta and segments of the aortic valve; and in Gibson's work on diseases of the heart I find that the writer seems doubtful whether the association may not be accidental.[2]

It is difficult to argue against an explanation that assigns accident to an association of disease in adjacent structures. A large number of statistics, perhaps, affords the only conclusive evidence. There are, however, a few features presented by the disease of the aortic valve, which is associated with aortitis, that

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[1] *Trans. Path. Soc. London*, 1898, vol. xlix. p. 46.

[2] "Diseases of Heart and Aorta," p. 819.

leave little doubt in my mind that one affection is dependent upon the other. In the first place, the deformity is almost invariably due to presence of increase of fibrous tissue, which occurs alone. Calcification, so prominent a feature of other varieties of aortic valvulitis, even of the form secondary to rheumatism, is very rarely present. This fact is of more importance than those unfamiliar with post-mortem work might be inclined to suppose, but a feature that affords clearer evidence of the connection between disease of the aorta and of the aortic valve is the fact that when one sinus of Valsalva only is affected with aortitis, the aortic segment that lies below the diseased sinus will probably be thickened, while the other two segments remain healthy. Sometimes, again, in early cases of aortitis the disease may be seen starting immediately above the meeting-point of two segments of the aortic valve, and small portions of these segments will present thickening, which is continuous with the thickening of the aorta.

There are also other features present in some cases of disease of the aortic segments associated with aortitis, that not only suggest a connection between the disease of the aorta and of the valve, but are of themselves of considerable interest. For example, it is in this form of valvulitis, in my experience, that retroversion occurs. The half of a segment, lying nearest its attachment, may become thickened and contracted, while the portion connected with the free margin remains comparatively healthy. As a consequence of this partial thickening and contraction, the belly of the segment is no longer able to bulge inwards during diastole to meet the firm support of its fellow segments, and the unthickened half, unable alone to resist the aortic blood pressure, becomes doubled back towards the cavity of the ventricle. When once this accident has happened, the healthy portion of the segment remains permanently retroverted on the diseased half.

The spread of the inflammation downwards does not always, however, lead to general or partial thickening and contraction of the aortic segments. Just as the aortitis may lead to softening and bulging of areas of various sizes in the aorta, so softening and yielding of the segments of the aortic valve may occur. In the museum of Guy's Hospital is an interesting specimen illustrating this condition. There is aortitis of one sinus of Valsalva, and the aortic segment below it, which is the only one of the three diseased, has yielded before the aortic blood pressure, with the result that the belly of the segment has been elongated down to a point about half an inch below the attachments of the other two segments. An inflammation which causes softening need not, however, lead to mere bulging; some museum specimens suggest that rupture or perforation of a segment may occur. One such specimen is in the Bristol Royal Infirmary Museum, and there are two specimens in the Museum of St. Bartholomew's Hospital, in which aortitis of a sinus of Valsalva occurs in association with ulceration or rupture of a segment of the aortic valve.[1] I am aware that it cannot be proved that the apparent ulceration in these cases is not consequent upon malignant endocarditis complicating aortitis, but in none of these specimens are there the vegetations so characteristic of this form of endocarditis. Such instances of bulging or rupture do not appear to be common, yet where the main feature of the disease of the aortic segments is deformity due to thickening, there is not infrequently evidence also of the former presence of softening. A common appearance is a yielding or breaking away of the attachment of a segment at one end of its free margin, which may result in an apparent tilting of the segment sideways. Such a condition is well described in the record of a case brought by Burney Yeo before the Pathological Society of London.[2] In this case, at one time during life, a sudden aggravation of the symptoms had led to the diagnosis of rupture of a segment of the aortic valve. At the necropsy the aorta was found to be the "seat of extensive atheromatous disease, . . and the right anterior and posterior aortic segments were torn down to their contiguous attachments to the aorta, so that they were separated from the wall of the aorta to some extent, and attached at a lower level than the other contiguous segmental attachments."

It has already been mentioned, that the form of valvulitis associated with aortitis very rarely shows any calcification. On the other hand, it is a curious fact that when the form of disease of the aortic valve is present in which deposit of lime salts is the most prominent feature, the aorta is almost invariably healthy. Possibly this may be of some importance. It is common to speak of calcification of the aortic valve as atheroma, but the fact that atheroma of the aorta and calcareous disease of the aortic valve are very rarely met with together, would seem to indicate that it is incorrect to apply the same term to the two affections. True atheromatous patches do occur both in the aortic and mitral valves, but they are generally small and of no pathological significance.

Although, unlike the preceding form of disease of the segments of the aortic valve, calcification of the valve is neither due to the spreading of inflammation from the aorta, nor is often associated with disease there, the calcareous changes do not frequently remain limited to the aortic segments. The disease shows a curious tendency to invade other cardiac structures. A thick calcareous process may extend down into the large flap of the mitral, or into the septum between the ventricles, or the posterior wall of the left ventricle may be invaded, and so extensively in some instances, that one would think cardiac action must have been seriously impeded.

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[1] An illustration of another example is given by Byrom Bramwell, "Diseases of the Heart," p. 503.

[2] *Trans. Path. Soc. London*, 1878, vol. xxix. p. 63.

This disease presents some other curious features. One would expect to find evidence of a chronic inflammatory thickening of the valve which had preceded the deposit of calcareous salts. Such evidence, however, is often strangely absent, It is not rare to see a rugged calcareous mass lying between two glistening healthy layers of endocardium, while the portion of the segment unoccupied by the mass also preserves a perfectly natural appearance. Of this feature I am unable to offer any explanation, neither can I understand the remarkable frequency with which these calcareous deposits occur where there are two instead of three aortic segments. The best marked examples of calcareous disease of the aortic valve I have met with in the post-mortem room, and in museums, have generally been where there are only two segments. Osler[1] refers to this liability of the two segments to suffer. Of fifteen examples of this congenital condition recorded by him, all were diseased. He has only met with two specimens in which the segments were healthy, and they were in the fœtus.

To briefly summarise a few of the points referred to above, it may be stated that there are mainly two forms of chronic disease of the aortic valve in adults. In one the disease is associated with disease of the aorta, and in the other the aorta is almost invariably healthy. In one the aortic segments are thickened and deformed by the presence of increase of fibrous tissue, but calcareous changes are absent; in the other there is little or no fibrous tissue, but great deformity due to calcareous deposit. In one, again, the disease seems to be an extension from the aorta, in the other it appears to arise primarily in the segments of the aortic valve. It may be added that one disease generally produces aortic regurgitation, unassociated with any stenosis, but the other almost invariably produces stenosis, which is not infrequently uncomplicated by regurgitation.

It may be worthy of mention here, that my experience does not enable me to agree with those who doubt the existence of uncomplicated aortic stenosis. I have met with no less than seven cases.

The etiology of these diseases is obscure. If the first-mentioned disease is secondary to aortitis, then the cause must be that of aortitis. That syphilis plays some part in the incidence of aortitis, few pathologists doubt, but whether it is alone responsible is open to question. My own experience would lead me to believe that syphilis is merely a predisposing cause. Early aortitis of the nodular type may occasionally be met with in patients who are too young to have contracted syphilis, and in my experi-

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[1] "Text-Book of Medicine," p. 766.

ence the worst examples of aortitis have been met with in sailors or soldiers who have been to the tropics. Durosiez has considered cardiac valvular disease to be more common in soldiers and sailors who have been abroad than in Frenchmen remaining at home, and has expressed his belief in a malarial endocarditis. His observation is probably correct as to the frequency of cardiac disease in soldiers and sailors, but this frequency need not be considered an evidence of a malarial endocarditis. The cases of aortic valvular disease noticed by him may have been secondary to aortitis. The aortitis, although probably not malarial, may have been set up by some organism that is more abundant or more virulent in hot than in temperate climates.[1] The possibility of the indirect effect of syphilis upon the aortic valve, by first causing aortitis, has been referred to, but it may be interesting to mention here, that I have met with one case of gumma of an aortic segment. It was in a man æt. 38, who died of nephritis secondary to urethral stricture. There were only two aortic segments, and in the right there was a nodule the size of a pea, composed of fibrous tissue with a caseous centre. The liver contained two small gummata and five or six scars of others; and two gummata of larger size were present in the spleen.

The etiology of the calcareous form of disease of the aortic valve cannot be described as clear. Syphilis, gout, alcoholism, Bright's disease, and hard work, all find a place in text-books of medicine as causes, but I am not aware that such statements rest upon any satisfactory basis. The frequency of the occurrence of calcareous changes, where there are only two aortic segments, possibly lends some support to the view that mechanical strain plays a part in the production of the disease. One would think that friction must be greater during systole, and the arterial tension not so easily supported during diastole, with two segments as with three. But mechanical strain can do little or more than predispose to the disease. We have seen that, when once started, the disease tends to invade surrounding structures, and this feature suggests that some locally infective process is at work.

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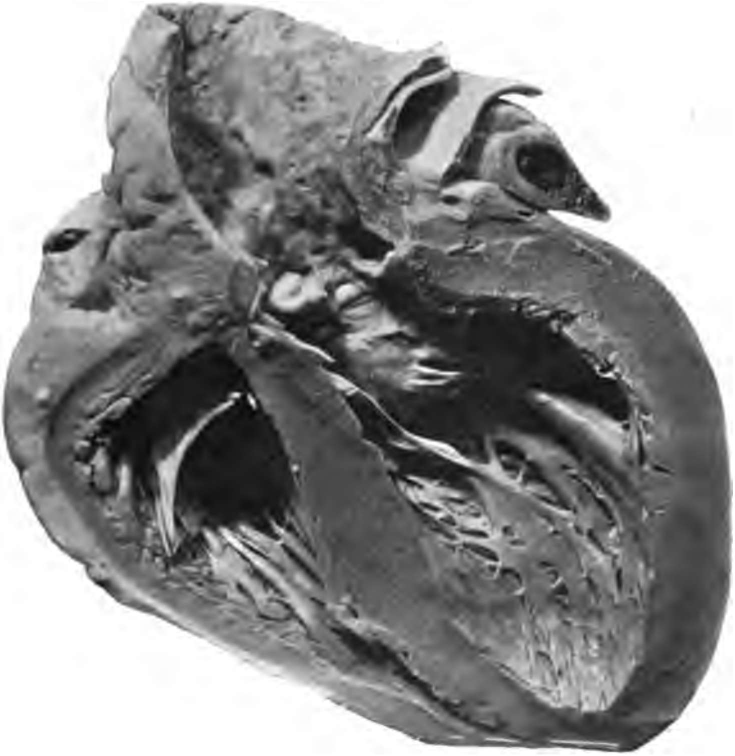
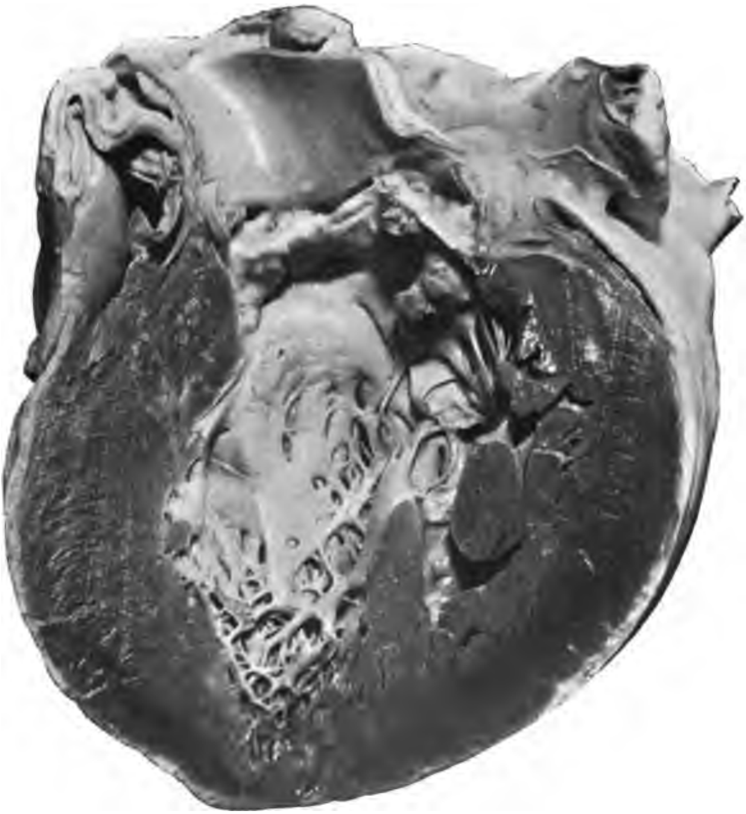
[1] Since the above was written, Lancereaux has read a paper before the Paris Academy of Medicine, describing a disease of the aorta met with in patients who have lived in malarious countries, and have suffered from intermittent fever. Lancereaux names the disease malarial aortitis.—*New York Med. Journ.*, 5th Aug. 1899, p. 204.



Aortitis associated with fibroid thickening of the segments of the aortic valve.



Calcareous disease of the aortic valve. Processes extend into the anterior mitral flap and into the septum ventriculorum. The aorta is healthy.

THE PLASTIC REPAIR OF URETHRO-PERINEO-SCROTAL FISTULÆ.

By E. Hurry Fenwick, F.R.C.S., *Surgeon to the London Hospital; Surgeon to St. Peter's Hospital for Urinary Diseases, London.*

This complication of neglected stricture urgently demands skilful repair by perineo-plasty, for the urinary burrows are a constant septic menace to the patient, besides being a constant source of annoyance and pain.

I have for years discarded the old-fashioned but still advocated plan of slitting up the burrows and stuffing the tracks with gauze, and in its stead I have freely dissected out each urinary tunnel until I have found the original "fault" in the urethral wall, for there is usually only one. After cauterising or otherwise treating this, I have brought all the freshly cut surfaces into careful apposition by salmon-gut sutures, and the result in thirty-five severe cases has been decidedly better, more rapidly secured, and in the main more permanently successful, than that obtained by the granulation plan. About six cases relapsed, the treatment of the causative stricture having been neglected by the patient; one died (Dr. Shaw's of Yarmouth), but he was uræmic. Of course it is not suggested that there is any originality in the plastic method; probably many surgeons employ it, though it is not advocated in our text-books. I obtained, I believe, my first idea of it from noticing Mr. Reeves repair an anal fistula, in 1889.[1]

Reservation axioms.—1. The urinary fistulæ to be treated must be *chronic;* it is obvious that plastic repair cannot be expected in tissues very recently inflamed.

2. The accompanying stricture of the urethra must be first efficiently treated by full dilatation or by internal urethrotomy. It is a wise plan to secure a free urethra some weeks before attempting plastic repair, for not only is great constitutional relief immediately afforded, but the fistulous channels also become less inflamed, and therefore more amenable, when the irritative urine is partially diverted. They even sometimes heal. Thus I operated a year ago upon a man who, for fifteen years, had passed all his water three times a day per rectum, not a drop coming the natural way. The patient immediately obtained complete control by internal urethrotomy, and left the hospital with a dry rectum. I presume the fistulous opening into the rectum was valvular, for I never had to repair it.

3. The condition of the urine must be first improved by boric acid or salol or hexamethyl entetramine (formin).

Illustrative Cases.—Case 1. *A perineal repair.*—A young officer, æt. 29, whose perineum was greatly indurated and undermined, especially on the left side at C (Fig. 1). Two fistulous openings existed (A and B, Fig. 1), through the latter of which much urine issued. These orifices were cut open, and found to communicate with each other and with the urethra at A′ A″ (Fig. 2). A branch tunnel led off from A to C. The walls of these open troughs were now dissected out and stitched up, but the two urethral openings at A′ A″ were cauterised with the actual cautery and lightly plugged with a fine gauze strip, to act as safety valves, the end of each strip being brought out of the stitched wound at points directly opposite to the urethral openings (Fig. 3).

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[1] Reeves, *Brit. Med. Journ.*, London, 1887, vol. i. p. 917.

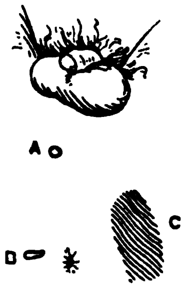

FIG. 1.

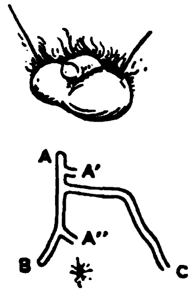

FIG. 2.

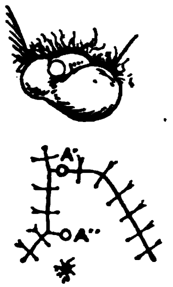

FIG. 3.

Two soft urethral strictures were fully dilated at the same sitting. He healed fairly well in three weeks, and was soundly healed in three months. He wrote me a year afterwards from the West Coast of Africa as follows:—

"Six months after the operation I walked a distance 200 miles from Lagos, and was not a bit the worse for it. I have not had any fever, and am stronger and fatter than when I came out; so much for Dr. ——'s official opinion, who said I would never be a 'fighting factor' again! I am fit enough to fight, ride, and walk anyone else out here."

CASE 2. *Perineo-scrotal repair.*—M., æt. 44. Scrotum riddled with

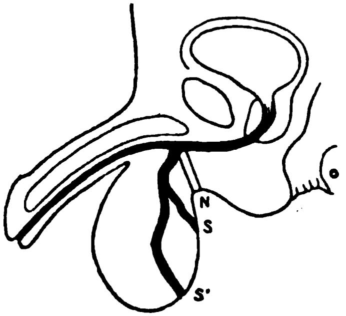

FIG. 4.

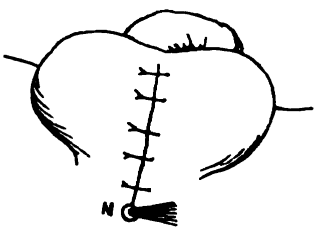

FIG. 5.

tracks. Two openings existed in middle line (Fig. 4). The perineum was boggy at junction of perineum and scrotum. Scrotum was split along raphe; the fistulous tracks were dissected out. The halves of scrotum reunited (Fig. 5). The original fault in the urethral tube was found, cauterised, and a safety-valve gauze strip brought out from it on to perineum immediately opposite. Free internal urethrotomy was performed, and a catheter tied in for twenty-four hours. Sound healing in three weeks.

REMARKS.—I treat the original "faults" a little differently now, and I think more successfully. I dissect up, but do not open the last part of the tube until I feel I have reached a level with its opening into the urethra. The tube-funnel and the urethra now represent an open T-tube. I apply to the walls of the freed fistulous tunnel a powerful crushing pile forceps, and smash the tube flat, right up to the urethral wall, but of course taking care not to pinch the urethra. I then clip away most of it. By this means I not only close the false opening flush with the urethra, but I leave a solid undimpled new floor to the old orifice. Cases vary in their duration of convalescence. Some apparently do not unite by first intention, but the final result is the same; in healthy subjects they unite firmly. I prohibit cycling afterwards unless a special saddle is procured.

THE HOT AIR TREATMENT OF DISEASE.

By SAMUEL HYDE, M.D., *Buxton.*

IN the present day both patient and practitioner enjoy many advantages over our forefathers of one or more generations back, when a narrow and bigoted conservatism in therapeutics, as mischievous as it was unscientific, opposed nearly all new principles and practices in the treatment of disease, and, whilst refusing to make unprejudiced inquiry, branded as medical heretics all who resorted to new methods of treatment. Now, however, the old order of things has given place to one of general and universal investigation into the physiological and therapeutical action of all remedies, likely and unlikely, which hold out a prospect of benefiting various morbid conditions of the body. If there be cause at all for complaint nowadays, it will be found perhaps in an overweening and restless desire on the part of many to be constantly searching for some new remedy or method of treatment, whilst neglecting or misapplying the known and well-proved remedies already close to their hands. This mistake, which has long been known in the department of drug-treatment, is now a distinguishing characteristic with many practitioners at health resorts, the exigencies of whose practice demand the use of various methods of physical treatment of disease by baths, massage, electricity, etc. So strong is this temptation, sometimes, that many men are impelled on the most extraordinary courses of action, thereby not seldom bringing scientific therapeutics into disrepute. What is required in the profession of medicine, and what I am glad to see is now taking place, is the patient and persistent investigation of the modes of operation of therapeutic agents, and the examination and fair trial of the various new or modified methods of treatment, which are from time to time presented to our notice.

A class of remedial agents, now claiming wide attention, embraces certain methods of the application of hot air locally to various parts of the body, and it has seemed to me that a useful purpose might be served by an article dealing with the general principles of treatment by high temperatures, and giving a comparative and detailed description of the most recent forms of apparatus for the application of thermal stimuli to the human body.

Before describing, however, the several methods and uses of hot air applied to the body locally, it is necessary to place before the reader a brief account of the physiological effects of high temperatures upon the animal organism, whether applied locally or generally.

THE PHYSIOLOGICAL ACTION OF THERMAL APPLICATIONS.—These effects are chiefly of the nature of thermal stimuli, and differ according to the form of application. It is also important to remember that the human body is more susceptible to the influence of such applications than are the bodies of lower animals, a difference due to the absence of a natural protective covering in the case of man. It is this susceptibility which is the cause of a special "reaction" always observed in some degree when water is applied to the human body at temperatures either above or below its own. These various applications operate as cutaneous stimuli, exerting primarily a vasomotor influence upon the capillary circulation of the surface of the body, and these are followed by local and distant reflex phenomena of the most striking and varied character.

It is customary to speak of "cold" and "heat" as though the terms related to two distinct forces or entities, whereas they refer merely to relative strengths or intensities of only one force, viz. caloric. In using the term "hot" in connection with the body, we mean an intensity of caloric in excess of its normal temperature. Now it is in this sense we speak of cold, warm, and hot baths, or other forms of thermal stimuli; and in discussing their physiological effects on the human organism, we must consider their effects upon—(1) the brain and nervous system: (2) the heart and circulation; (3) the respiration; (4) the temperature of the body; (5) secretion and excretion. Before doing so, however, I desire to say a few words about the thermal conductivity of animal tissues,—a subject of special interest in connection with thermo-therapeutics, but one which has not received much attention at the hands of investigators.

It is chiefly due to the layer of fat beneath the skin that the heat of the human body is conserved and its conduction from internal organs is prevented. And as heat is thus prevented from being conducted out of the body, so the various degrees of caloric are in large measure prevented from entering into the body.

Griess has investigated the thermal conductivity of various animal tissues, such as the skin, bladder, hoof, horn, and bones of an ox, and the stomach of a sheep. By heating one part of the tissue and placing thereon pieces of wax, he came to the conclusion that fibrous tissues conducted heat more readily in the direction of their fibres than at right angles to their course. He arrived at this result by observing when and in which direction the pieces of wax commenced to melt. This opinion is supported by Landois, who found that tissues conduct heat best in the direction of their fibres. Next to bone, blood-clot is the best conductor. Bloodless skin is a bad conductor compared with skin containing vessels filled with blood, consequently the former gives off little heat, whilst the latter gives off freely and proves a good conductor of heat.

Now let us consider briefly the physiological effects of the hot bath, which, whether in the form of hot-water bath, vapour bath, or hot-air bath, exerts very powerful effects on the organism, and necessitates great care in its application. Its physiological action is almost entirely the reverse of the cold bath, and will be best explained, as before indicated, by a reference in turn to the effects produced upon the brain and nervous system, the heart and circulation, the respiration, the temperature of the body, and on secretion and excretion.

1. *On the brain and nervous system.*—Although the hot bath acts at first as an excitant, that is but transitory, and the general effect is that of a depressant. It produces a distinctly sedative influence on the sensory nerves, as is evidenced by the relief of painful parts by hot bathing. If the body be immersed for a long period in a hot bath, there is produced general nervous depression, languor, muscular weakness, drowsiness, and ultimately convulsions and coma may result.

The profound vaso-dilatation which affects the more superficial blood vessels of the body, causes a partial emptying of the deeper blood vessels and a slowing down of the circulation. As a result of this, the internal organs, including the brain and the spinal cord, become more or less anæmic.

2. *On the heart and circulation.*—Hot baths accelerate the heart's action, the frequency of its beat being in direct relation to the amount of vaso-dilatation of the superficial blood vessels. The effects on the general vascular system and circulation are

extremely marked. Redness and hyperæmia of the skin is produced, owing to dilatation of the superficial vessels. Dr. George Oliver has shown that hot immersion baths of 100° F. to 105° F. applied to the arm, quickly reduce the calibre and pressure of the radial artery, owing to the rapid dilatation which takes place in the arterioles and cutaneous periphery. This vaso-dilatation causes turgescence and swelling of superficial parts of the body, so that if the volume of a limb be measured immediately after the hot immersion, it will be found greatly increased; but this increment speedily subsides, and it therefore differs from the larger and more persistent increment of a limb induced by exercise.

3. *On respiration.*—The respiration is greatly accelerated as a first effect of hot baths, but the respiratory movements become slower if the bath is continued. Nevertheless increased respiration continues so long as the vaso-dilatation renders such respiratory aid necessary.

4. *On the temperature of the body.*—The effects of hot baths, like those of cold baths, on the temperature of the body are remarkable and interesting. The first effects are really cooling effects, and more heat is radiated from the body during the bathing process than under ordinary conditions. This is necessary, otherwise the temperature of the hot bath would increase the normal temperature of the body. To effect this compensation, the superficial vascular dilatation, with its increased secretion of sweat, and the accelerated respiration, with its increased excretion of the products of combustion and watery vapour, all contribute their share. It would also appear that the heat-producing mechanism of the body is slowed down so that the compensatory elimination of heat is rendered more easy and certain.

From experiments upon guinea-pigs, conducted by D. Finkler, it has been shown that the production of heat was more than doubled when the surrounding temperature was diminished 24° C. The metabolism of the guinea-pig is increased 23 per cent. in winter as compared with summer, thus showing the same relation to exist as in the case of a diminution of the surrounding temperature during a short period of time. From this we may assume that a converse action takes place when the body is immersed in a hot bath consisting either of water, vapour, or air.

5. *On secretion and excretion.*—The kidneys are stimulated to increased secretion, as also are the salivary glands sometimes. The sudorific glands become more active, and sweat is poured out in increased quantity. There is no very trustworthy evidence as to the physiological influence of hot baths on the secretion of the liver. According to Pfluger, when animals are placed in a hot bath at a higher temperature than that of their own bodies, the excretion of carbonic acid from the lungs is increased, owing to stimulation of their metabolism. There is also increased excretion

of watery vapour from the lungs, as we have already seen. With the augmented secretion of urine there is increased excretion of urea and uric acid. Hot baths increase the intestinal secretion, but lower the muscular tone of the bowels, and thus favour constipation.

I may here mention that partial hot bathing of one part of the body will sometimes produce a sweating effect upon another part. Thus one leg or one arm immersed in a bath of hot water, hot air, or hot vapour, not infrequently causes sweating of the corresponding limb.

Having thus briefly discussed the general physiological effects of the application of baths at high temperature on the body, the reader will be able to understand more clearly the action and effects of the local application of hot air to the human body in the treatment of various forms of disease. Before, however, discussing the clinical uses and effects of these forms of treatment, I propose to give a short description of the principal appliances which are now at the disposal of the profession.

THE TALLERMAN APPARATUS.—This method of applying superheated air to parts of the body was introduced to the profession in England about the year 1893, under the name of "The Sheffield Tallerman Treatment," and has been extensively used with considerable success in this country and abroad.

The apparatus consists essentially of a copper cylinder forming a chamber for the reception of a limb or part of a limb. This chamber is filled with dry superheated air, the source of heat being either gas, oil, or electricity, as may be most convenient for the purpose. The apparatus, although somewhat cumbersome, is portable, and can be conveyed to the patient's bedside. When gas is used for heating, it can be taken from an ordinary gas-fitting by attaching a flexible tube which supplies several gas jets under the cylinder. The proprietors have also arranged a system of electric heaters in connection with the apparatus, which are useful for heating the air where electricity is available. In country places where neither gas nor electricity is at hand, oil can be used as the source of heat. Modifications have now been made to the apparatus, by which hot dry air may be used internally as well as externally, and the hot air, at any desired temperature, medicated or otherwise, introduced either by inhalation or injection into the lungs or other internal cavities of the body.

The value of this apparatus is well established, and if it were possible to increase its portability and to relax the restrictive commercial conditions which have hitherto limited the area of its usefulness, there is no doubt that it would be used much more extensively than it now is. As it is, however, and notwithstanding that (like other similar modern methods of the local application of hot dry air) it is but a more practical and methodical system of carrying out principles of local thermal treatment long known to the medical profession, I cannot withhold the well-merited praise which is due to Mr. Tallerman for having introduced to us a really efficient and valuable apparatus.

THE DOWSING RADIANT HEAT BATH.—This apparatus consists of an arrangement by which the heat produced by several powerful incandescent lamps, suspended within deeply recessed reflectors, is radiated or reflected on to any part of the body desired. The lamps or heaters, together with their reflectors, are mounted on stands which possess movable arms, by which they can be conveniently adjusted so as to more or less enclose the part of the body intended to be exposed to the powerful rays of heat generated from the lamps.

The advantages of this system of applying superheated air are very obvious. There are no possible means of contaminating the air of the room by products of combustion, there is no risk of fire, and it is easy to apply this radiant heat to parts of the body practically inaccessible to the Tallerman and similar apparatus. There is also less risk of producing burns on the surface of the patient's body which does not come in contact (even for rest) with any part of the apparatus itself, the enclosing reflectors being gradually approximated so as to enclose a sufficiently large space around the part, quite independently of the pillow or other rest supporting the same. The current of electricity for producing the radiant heat in this apparatus can be obtained from an electric light main by an ordinary movable attachment, and the temperature of this local hot-air bath may be graduated by means of a special regulator throughout a range of over 400° F.

A great drawback hitherto of this apparatus has been the difficulty of completely surrounding a part, say a limb, with the direct rays of heat; but this has now been overcome by the construction of suitable cylinders, which admirably meet the purpose. The more serious drawback is that of cost. Electricity is, as a rule, much more costly than gas or other common sources of heat, and in many places it is not obtainable at all, so that these considerations limit the usefulness of the system. Nevertheless, in simplicity, cleanliness, and safety, the Dowsing system has much to commend it, and, allowing for the drawbacks mentioned above, it possesses many advantages over similar apparatus.

THE GREVILLE ELECTRO-THERMIC GENERATOR.—An apparatus has recently been brought out, bearing the designation of the Greville Electro-Thermic Generator, possessing many features which recommend it for use as an efficient means of applying superheated air to the body in the treatment of many forms of disease. The thermal effects of electricity have long been made use of for the heating of stoves, ovens, and other useful appliances, and the inventor of this apparatus has taken advantage of this principle, and by a simple and ingenious arrangement has produced his apparatus.

As in the case of the Tallerman system, the "Greville" appliances are mainly applicable to the upper and lower extremities of the body, and, subject to several modifications, they consist of a rectangular box or case made of aluminium and of an internal perforated metal cylinder. In the space between the internal cylinder and external case are stretched in numerous convolutious sections of electric wiring having a high resistance. The ends of the wires are attached to suitable terminals outside the generator. When it is desired to bring the latter into operation, it is only necessary to connect these terminals, by means of double wires, to an electric wall-plug, or to an ordinary electric light pendant, by using an adaptor in place of the usual incandescent lamp. This connection having been made, the current passes through the sections of thin wire in the generator, and, owing to the resistance met with, generates heat by which it is possible to raise the temperature of the interior of the cylinder to at least 400° F.

The wiring in the generator is arranged in separate sections, so that the attendant can vary and regulate the temperature inside the cylinder by switching on or off different sections of wire.

Mr. Greville has designed several kinds of generators suitable for the application of hot air, obtained upon the above principle, to the arm, shoulder, elbow, hand, leg, hip, knee, foot, spine, etc. To protect the parts of the body from coming into contact with the perforated metal lining of the cylinder, the generators are padded inside, and to prevent waste of heat, mackintosh sheeting lined with asbestos cloth is attached round the entrance of the cylinder, and this can be secured round the limb outside the generator by a bandage or other simple means. If it be desired to apply the hot air only to a middle joint, such as the knee or elbow, a short generator open at both ends, but having a double asbestos cloth arrangement, is used.

As in the case of the "Dowsing" apparatus, this system possesses advantages of simplicity and cleanliness which are more or less wanting in other hot-air arrangements, depending for their source of heat upon the combustion of gas or oil. One great objection, however, applies to this system as in the case of the "Dowsing," viz. the cost of an electrical source of heat, and the comparatively few institutions or dwellings where a supply of electricity is obtainable. Another disadvantage is the risk of the padding inside the generator becoming, after a time, fouled by the vapours exhaled from the parts subjected to high temperatures. This, however, is a matter which may be obviated by a frequent renewal of the lining material.

THE ELECTRO-THERMOGEN.—Dr. William Taylor of Edinburgh has devised a very ingenious apparatus for the application of currents of hot air to local parts in neuralgia and other painful affections, which will prove a very useful addition to our present methods of local thermal treatment. The apparatus is small and portable, consisting of two parts—one of metal and the other glass. The former is a metallic chamber containing a fan and a clock-work or electro-motor, by which it is rapidly rotated to drive out the air from a small chamber above the fan through a rubber-lined orifice. Into this orifice is inserted the glass portion of the apparatus, consisting of two tubes, one inside the other, the outer one being prolonged downwards and inserted into the orifice of the air-chamber. Around the inner tube is wound in spiral form a fine wire connected with two terminals fixed in the outer tube, and to which are attached properly insulated wires for conducting a current of electricity from a convenient source to heat the spiral wire surrounding the inner tube. When the fan is set working it revolves at a rapid rate, driving a current of air through the tubes which is heated in transit, and as it emerges can be applied directly to any affected part of the body desired.

To provide a proper resistance, Dr. Taylor uses a lamp-holder midway between the adapter and the attachments to the tubes for the reception of two ordinary electric incandescent lamps.

To bring the apparatus into operation, it is only necessary to make the attachments to the two terminals of coiled wire and the four terminals of the lamp-holder, and then insert the adapter into the socket of an ordinary house electrolier, from which the lamp has been temporarily removed, when the lamps will immediately commence to glow. The clock-work, having been previously wound up, is started, and the fan being set to work, a current of hot air rushes from the tube, which can be delivered on a part at varying temperatures up to the highest possible degree bearable by the patient.

It is well known that still cold air can be borne at a lower temperature than moving air, and the same holds good in a reverse degree of hot air. For example, a steak requiring thirty-three minutes to cook in a temperature of 260° F., can be cooked at the same temperature in thirteen minutes if the hot air be blown upon it by means of a fan or bellows. In this connection Dr. Taylor points out that he has found, in treating neuralgia, currents of moderate temperature long continued are more effective than more intense currents of short duration.

By using a larger sized apparatus, this form of treatment is useful in cases of lumbago, sciatica, and painful affections involving large parts of the body.

THERMAL AIR CHAMBER.—An apparatus made from the designs and suggestions of Dr. R. Fortescue Fox of Strathpeffer, has been recently brought out. It is a most simple, portable, and useful appliance for the local application of superheated dry air to the upper and lower extremities. It consists essentially of a wooden box, lined with asbestos cloth, the source of heat being a powerful spirit lamp situated underneath. The hot air passes into a double bottom of metal, entering the box through a fine wire meshwork, and is distributed throughout the chamber, afterwards leaving the box by openings which are graduated by sliding valves. With this apparatus it is possible to subject a limb to a temperature of 250 to 300° F.

I have now given the reader a description of the various methods of applying hot air locally in the treatment of disease, which are at the disposal of the profession. It will be observed, however, from what has been said, that none of these methods are absolutely perfect, and, whilst each apparatus possesses, it may be, some advantages which are lacking in the others, all, without exception, possess in greater or lesser degree an element of risk rendering extreme care necessary on the part of the attendant to prevent severe burns of the patient's person. But this is perhaps inevitable in the construction of any really efficient local hot air apparatus.

Advantages of treatment by heat locally.—It cannot be denied that the recent tendency in favour of local methods of thermal treatment, in lieu of general methods, in which the whole body is exposed to a large volume of hot air or vapour, has been productive of good. After an experience of nearly a quarter of a century of bath treatment, and practical observation of the effects of higher thermal appliances, no conviction has become more deeply rooted in my mind than this, viz. that great and lasting injury is frequently incurred by patients suffering from certain varieties of disease, in consequence of the improper or excessive use of Turkish, Russian, and other hot baths. Cases are constantly coming under my observation, particularly of rheumatoid arthritis, which, either on their own initiative or the mistaken advice of their medical attendants, have taken prolonged and repeated courses of Turkish or similar baths with disastrous results. My case-books abound with notes of such patients, and I feel that I cannot too strongly condemn the free use of general hot baths of any kind in diseases associated with lowered nervous tone and depraved nutrition. And here I would warn the reader against the danger of being deceived by the apparently great benefit which so often results at first from the use of such baths in these cases. These results are often really marvellous to the casual and inexperienced observer, but, alas! they form in too many instances only transitory and delusive periods of relief precursory of an aggravated state of the disease, which is the direct result of the over-stimulating effects of this higher thermal treatment.

Upon this subject I may be permitted to speak with some emphasis, as in my earlier writings I was perhaps the first spa-practitioner to call the attention of the profession to this important subject. Since then it has afforded me satisfaction to receive recognition of these views in the medical press, and also from numerous members of the profession resident in this country and abroad.

Upon this question I regret that I cannot agree with Dr. Douglas Kerr and Dr. W. S. Hedley, that in using the hot air bath, the more extensive the surface of the body to which the heat is applied, the better the results. These gentlemen recommend, as a rule, the use of the "full bath," excluding the head, in preference to purely local applications. Now, whilst I will not deny the great benefit obtained by the full bath in many affections in which free diaphoresis and more general effects are desired, I contend that it is in the easy adaptability of these new hot air appliances to local parts, as in joint affections, sciatica, lumbago, etc., that their chief and peculiar value lies. Otherwise the Turkish or hot air box-bath would serve our purpose equally well. Our object, especially in chronic joint affections, should be to produce the greatest possible local effects with the least possible general disturbance. Not that we can ever hope to benefit chronic rheumatoid joint affections by any form of local treatment, without at the same time using measures for restoring the general health, but these general measures must lie more in the direction of pure air, exercise, diet, and baths of lower thermal activity, and more tonic influence than the hot air applications to the joints.

Holding as I do the opinions just expressed on the frequent pernicious effects of general hot baths, I am the more prepared to recognise the advantages which local hot air baths often possess in the treatment of disease in which general hot air or vapour baths are contra-indicated. In chronic joint affections of rheumatic or gouty origin, in lumbago, sciatica, and similar painful nerve affections, local hot-air baths form one of the most valuable adjuncts of modern therapeutics. Also in certain skin diseases, in some acute and chronic kidney and liver affections, and in other diseased conditions which will occur to the reader, great benefit can be derived from their judicious and careful use.

There has been much discussion on the therapeutic advantages of luminous rays of heat over non-luminous heat rays, and it has been claimed for the Dowsing apparatus that greater benefit may be expected from its use, on account of the penetrating quality of the heat rays than from the dark heat of the Greville apparatus. It is true that rays of sunlight and also electric light exert powerful effects not only upon the skin, as has been pointed out by Dr. Bowles, but also upon the circulation and other nutritive processes, but our knowledge upon the subject is so meagre that we may for the present assume that the heat, if dry and of sufficiently high temperature, is of equal therapeutic value.

whether derived from a luminous or non-luminous source. Personally, I have observed excellent results in stiffened and painful joints, sciatica, lumbago, etc., by the employment of the various forms of local hot air baths, whether with luminous or non-luminous heat.

So far as the local effects of this treatment are concerned, the benefit is not difficult of explanation. As we have seen, the effects on the circulation in the tissues exposed to the influence of the hot dry air are very marked. There is increased circulation *in* the parts and *to* the parts, so that the process of tissue metabolism is stimulated, and changes of a recuperative character are encouraged.

Thus far, I have referred mainly to the usefulness of the hot dry-air bath in the treatment of certain local joint and painful nerve affections. There are, however, numerous other diseased conditions in which its judicious use is beneficial.

Dr. Knowsley Sibley and others have used the treatment with some success in chorea and epilepsy. Locomotor ataxy is also said by some to be benefited. In my experience, however, higher thermal treatment in any form is not only useless, but seems to be often injurious, in most of these cases of central nervous disease. Nor can I bear out the testimony of some as to the benefit of hot dry-air treatment in chronic bronchitis or cardiac affections, except when associated with renal disease. In such cases, however, the ordinary box vapour bath is more useful. In many pelvic troubles of women the bath is often of great service. Skin diseases of various kinds are also frequently amenable to this form of treatment after other measures have failed.

In concluding this cursory and necessarily imperfect résumé of a subject which is at the present time exciting considerable attention in the profession, I venture to hope that I have given the reader a fairly clear idea of the principles which underlie this special form of treatment, and that, in describing the various appliances for its administration, I have given an impartial account of their merits or demerits without fear or favour. Whilst it is only an act of justice to acknowledge the valuable services which have been rendered to the profession by Messrs. Tallerman, Dowsing, Greville, and others, in designing and producing the several forms of hot air apparatus now available, I cannot refrain from the expression of a hope that these gentlemen may see their way to relax and modify the commercial conditions which have hitherto acted as serious drawbacks to the extended usefulness of their appliances.

PALPATION OF THE PANCREAS IN SPLANCHNOPTOSIS (GLÉNARD'S DISEASE).

By R. LLEWELYN JONES, M.B. (Lond.), M.R.C.S., *Assistant Medical Officer to the Durham County Asylum*; and T. ALDOUS CLINCH, M.D. (Edin.), *Pathologist to the Durham County Asylum.*

CASE.—Patient, an old woman, æt. 73, of thin spare habit, was suddenly seized with an attack of faintness. She was conveyed to bed, and on examination her temperature was found to be 98°·8, and her pulse extremely feeble and irregular, the arteries being atherosed. Stimulants were administered, and she rallied fairly satisfactorily. As soon as her condition allowed of a more thorough examination, the following details were elicited:—

3rd December.—In the evening her temperature registered 101°·4. Pulse 120, feeble and irregular. Her face was cyanosed, with dilated venules, her chest rigid, its walls thinly covered, its upper interspaces wide, its lower cramped and oblique; much infraclavicular retraction of the apices; the præcordial area prominent, the apex beat very diffuse, its point of greatest intensity lying in the sixth space external to nipple line; pulsation in the second, third, and fourth left intercartilaginous and costal spaces, also in epigastrium. Palpation revealed a slow, heaving cardiac impulse, and increased vocal fremitus at the left apex. Resonance was muffled over both apices, and the area of deep cardiac dulness was much increased. The breath sounds over both apices were markedly congested in character, and over the left clicking râles were heard. The resonance over both bases posteriorly was muffled, the breath sounds were bronchial with moist sounds, and vocal fremitus was increased over the left base. The abdomen in its upper half was flattened, while below the umbilicus it was distended and tympanitic, but a well-defined area of dulness extended from the infrasternal notch as far as the umbilicus. No enlargement of the liver below the ribs was detected, and the above-mentioned area of dulness seemed difficult of interpretation. The area in question felt resistant, but was apparently painless. Great difficulty was encountered in the abdominal examination, the patient being very demented, extremely irritable, and actively hostile. Her urine was high coloured, sp. gr. 1017, containing albumin.

4th December.—Temperature, 101°; pulse, 120; respiration, 40. Patient very cyanosed; tongue dry and brown; bowels confined; retention of urine. Quinine, digitalis, and ipecacuanha were given, also small doses of opium to allay her restlessness and irritability. Milk and alcohol were given and taken well. Her bowels were regulated by calomel and jalapin, with occasionally glycerin enemata.

5th December.—Coarse friction was heard over left lung posteriorly, up to the angle of the scapula, with loud bubbling râles, with marked dulness and increased vocal fremitus; a few râles were heard over right base.

6th December.—The pleuritic rubs have disappeared, also vocal fremitus, but the dulness is more marked, and breath sounds very feeble. Aspiration revealed presence of 6 oz. of fluid, the removal of which was followed by a partial return of resonance. The right base increasingly dull, with loud coarse râles. Heart sounds loud, ringing, very faint; systolic *bruit* over fourth costal cartilage.

7th December.—Patient extremely cyanosed; respiration, 25; temperature, 98°·8; pulse very feeble, rapid and running; much recession of lower interspaces; friction returning over left lung, with occasional friction over right base. The systolic bruit above noted has increased markedly. Its point of greatest intensity was the fourth costal cartilage; from thence it was conducted outwards towards right nipple, rapidly tailing off towards base and apex. The bruit was plainly distinguishable behind over suprascapular region. The first sound was extremely indistinct.

Patient, while in the act of feeding, suddenly gave a loud shriek, dying almost immediately. In explanation of the above-mentioned bruit, it has been suggested that its origin is in some way connected with the formation of pre-mortem clot.

NECROPSY.—On opening the abdomen, one was at once struck by the altered relations of the viscera. In place of the rounded prominence of the stomach, the small omentum was seen drawn tense over the pancreas, aorta, and spinal column, all of which were plainly distinguishable through it both visually and palpably. The liver was at first invisible, having been rotated on its transverse axis so that its anterior edge disappeared beneath the margin of the ribs, while the posterior edge was hidden behind the hepatic flexure of the colon. The stomach, of normal size, was found about the level of the umbilicus; and below it, occupying the lowest segment of abdomen and pelvic cavity, lay a confused medley of small and large intestine. On disturbing the organs somewhat, the spleen, similarly dislocated downwards and driven inward by the increased narrowness of the costal arch, was found to have contracted adhesions to the left lobe of the liver.

The kidneys, infarcted, granular, and cystic, lay beneath the posterior layer of the peritoneum, unsurrounded by fat, and slipping about readily under the slightest touch as far upwards as the liver and as far downwards as the true pelvic cavity. The uterus, disdaining to be outdone, lay retroverted in Douglas's pouch.

On removing the anterior thoracic parietes, the increased size of the heart was extremely apparent; its pericardial investment was thickened, inflamed, and gelatinous, and held in its cavity a small amount of turbid, blood-stained fluid. Over the left ventricle, fibrinous exudation formed feeble adhesions with the epicardium. The cardiac tissue, more especially of left ventricle, was rigid, thin, and hard, the seat of chronic myocarditis, a diagnosis amply confirmed by the microscope.

Covering the inner surface of the heart, and insinuating itself between the columnæ carneæ, was a quantity of pinkish, homogeneous-looking blood-clot, firmly adherent, and obviously of pre-mortem formation.

The cavities were much dilated, and the mitral orifice in some degree narrowed. The aorta was dilated, and its lining membrane degenerate and calcareous.

The lungs were the seat of senile atrophy and emphysema,' both slightly adherent at the apices, and the right, in addition, bore the traces of old tubercular disease in that situation, while the base on the left side was collapsed, and on the right congested. Moreover, the left pleural cavity contained a few ounces of blood-stained fluid.

The contents of the cranial cavity showed the familiar changes incidental to chronic insanity, *i.e.* thickening and opacification of the membranes, œdema, and atrophy of the nervous tissues, and atheromatous degeneration of the vessels.

REMARKS.—Among the many points of importance in this case, it is difficult to say which is the more interesting, the thoracic or the abdominal complications. It will be better, perhaps, to consider first the cardio-vascular condition.

In the atheromatous radial, coupled with the albuminous urine, we find the evidences of peripheral vascular degeneration; the diffuse, apparently powerful cardiac impulse, contrasting with the feeble hesitating pulse, point to the central degeneration.

Looking at the conditions, *i.e.* renal and vascular, we are confronted with the old problem as to whether the kidney simply participates in a general arterio-sclerosis, or whether the vascular degeneration is secondary to the renal disease.

In view of the extensive distribution of the vascular changes, and, in addition, the absence of any marked diminution in size of the kidneys, we are inclined to regard the arterial changes as primary, and the renal as secondary. In the absence of signs of actual valvular disease, and in view of the moderate kidney complication, we were led to suspect cardio-mural degeneration secondary to coronary disease. This leads to two well-known forms of degeneration, *i.e.* fibroid and fatty; and if we remember the essential points of difference are, that in the fatty the cardiac impulse is weak, very often hard or even impossible to localise, and hardly ever visible, and that in the fibroid the impulse is heaving, resistant, diffuse, both visibly and palpably, we shall see at once that the physical signs point to the latter condition, whilst, if we desire further evidence of mural degeneration, we have it in the absolute want of reaction to cardiac tonics.

We now come to the lung condition, and we find in the unyielding ribs and cartilages the upper interspaces widely divided, and the lower cramped and oblique, together with the humped back, evidences of atrophic pulmonary change. *En passant* we might allude to the presence of pulmonary collapse (probably secondary to fluid effusion) coexisting with senile atrophy,—an association said to be by no means uncommon.

To take a broad view of the matter, may we not consider the atrophy of the lungs and the general ptosis of the abdominal viscera part of a common degenerative process? that is to say, in each case we are dealing with an atrophy of interstitial tissue, which in the lungs has led to a fusion of the vesicles by absorption of the septa, and in the peritoneal tissues has operated by the wasting of the fat, not merely of the fat globules themselves, but the actual protoplasmic envelopes; the loss of fat being, indeed, the result of the destruction of the cells containing it, as that the capsules of the various organs become too big, and the ligaments too weak to support their weight.

We now come to the point in the paper which we consider of most interest and practical importance, *i.e.* the exposure of the pancreas. This is a phenomenon, as far as we know, hitherto undescribed. In the normal the pancreas is covered by the layer of peritoneum constituting the posterior wall of the lesser peritoneal sac, and anterior to this lies the stomach, protected by the recti muscles, etc. Consequently, in the normal subject, the pancreas is absolutely impalpable.

In the present case the evidence of exposure of the pancreas was misinterpreted, but nevertheless, on a future occasion, it seems to us that it should not be impossible to recognise its exposure, and thereby to draw the deduction that downward dislocation of the stomach, or gastroptosis, is present. To recapitulate, the signs on which stress should be laid appear to be the following:—

The position of the pancreas, which crosses the vertical column 3 in. above the umbilicus, passing somewhat downwards on the right; an area of dulness corresponding to it, this area being unaffected by respiration; epigastric pulsation (the aorta); the palpation of a firm, smooth, somewhat sausage-like body; the flattening of the region above the umbilicus, with the distension below.

The conditions with which it is likely to be confounded are practically—impacted fæces in the transverse colon, tubercular peritonitis, simple chronic peritonitis and omental growths; enlargements, cystic and otherwise, of the pancreas; enlargement of the retro-peritoneal glands; tubercular, lymphadenomatous, or malignant tumours of left kidney; enlargement of gall bladder, collections of fluid in the lesser peritoneal sac; cancer of the pylorus or transverse colon; enlargement of left lobe of the liver, whether malignant or otherwise.

It will be seen that exclusion plays a large part in the diagnosis, but it seems to us that to remember the existence of Glénard's disease goes a long way towards making the diagnosis.

The mental condition of the patient precludes our being able to attach any importance to her subjective sensations, but we feel able to suggest that the cramped, doubled-up posture which was invariably adopted by her, may have been an unconscious effort to relax the tension thrown on the supporting abdominal ligaments. Again, that the disease is well known to be associated with abdominal hypochondriasis is the best condonation that can be adduced for her atrociously bad temper.

CLINICAL RECORDS.

A CASE OF OBSTRUCTION OF WHARTON'S DUCT, DUE TO A PATHOLOGICAL CONDITION OF THE SALIVA, AND COMPLICATED BY AN ALVEOLAR ABSCESS ON THE SAME SIDE.

By H. STANLEY TURNER, M.R.C.S., L.R.C.P. (Lond.).

W. C., æt. 30, gardener, consulted me for swelling in the floor of the mouth, giving rise to pain, and pushing the tongue upwards and at the same time limiting its mobility; also a fulness in each submaxillary region (chiefly the left), which was painful on pressure.

Previous history.—Patient says he has suffered from periodic swellings in the submaxillary region ever since he was a boy, and that they were sometimes uni- and sometimes bilateral. These swellings would appear in quite a short time (a few hours). Patient would rub them with his thumbs, and after some little rubbing they would gradually get less and quite disappear. Patient noticed that the amount of saliva in his mouth increased as the swelling disappeared. Otherwise he has enjoyed very good health, and his appearance quite bears out this statement.

Present history.—Patient retired to bed perfectly well, and on waking up in the morning "was astonished to find the lumps in his neck and mouth."

Present condition.—He speaks in an indistinct way, as though he had a plum in his mouth; there is a slight fulness to be seen under the chin, chiefly to the left side. On inspecting the interior of the mouth, a swelling is seen on either side of the frænum linguæ; this swelling is considerably greater on the left side. The slight amount of saliva present in the mouth appeared to be more of the consistency of nasal mucus than of normal saliva. The teeth were very dirty, and there was a considerable amount of tartar round their necks. There was only one molar present on the right side below; this was deeply carious on the anterior aspect, and discoloured generally. Patient said it sometimes gave him trouble. The swellings on the floor of the mouth did not fluctuate, but movement of the tongue was found to be limited partly by the tightness of the frænum and partly by infiltration of the sublingual tissue. On each side of the frænum could be seen the orifice of either duct, which appeared larger than normal, and from which a little thick mucus-like saliva slowly exuded. On making pressure over the swelling, the flow of saliva could not be increased. There was no fluctuation over the swelling in the submaxillary region; it was very tense, but caused little or no pain except on pressure or movement. No enlarged glands could be felt. As far as one could make out, there was no increase in size at meal times, though it then became slightly painful, but whether from movement or from increased tension one could not say.

Progress and treatment.—In order to make out whether there was any variation or not in size or tension during and after meals, I inquired what the man most fancied in the way of food, and directed him to go home, and come to me in the morning immediately after a breakfast of his preferred food.

On his arrival next morning, I was astonished to find the swelling on the left side was quite away inside the mouth, and much diminished in the submaxillary region. The swelling on the right side of the floor of the mouth, however, was twice or three times its previous size, and the *right* submaxillary region was much larger than the left. At this period the swelling was quite confined to the submaxillary region, and did not encroach upon the rami of the jaw. On raising the tongue with a spatula and exposing the orifices of the ducts, one was able to make out by sponging, that though saliva issued from the left side, none came from the right.

The reaction of the saliva was found to be very slightly acid.

In the hope that this swelling might clear up as the other one had done, I sent the man away, telling him to call in the evening, after feeding as before. When he returned at night, the swelling was considerably increased in size, and was causing sharp pain evidently from distension. As the obstruction was quite acute, I came to the conclusion that it was either due to (*a*) a calculus blocking up the duct, or to (*b*) plugging with the abnormally acid and viscid saliva, possibly accompanied by precipitation of mucin.

Accordingly, I decided to pass a sound up the duct, with the view of determining more precisely. This sound I made from fine silver suture wire, the sharp point of which was suitably blunted. The man having rinsed out his mouth with a solution of carbolic acid (½ drm. to 6 oz. of water), the sound (boiled) was passed into the orifice of the duct, being held in such a manner that it was allowed to choose its own direction without the employment of force. The direction it took was first outwards, backwards, and slightly downwards, then backwards and downwards, its passage being facilitated by the natural curve which wire from a spool is inclined to assume. Exactly 3½ in. passed inside, and on withdrawing slowly and following up the end of the sound by pressure from the index finger inside the mouth, a quantity of jelly-like saliva, containing some large flakes of mucin, was expressed. This manœuvre was repeated three or four times with a similar result. No calculus was discovered, but the man said the swelling inside the mouth felt much smaller. I gave him the following:—

℞	Acid. carbol. liquefact. . .	ʒss
	Liq. atropinæ sulph. . .	ʒj
	Aq. dest. ad	℥vj

Sig.—One tablespoonful in water as a mouth-wash.

Also a mixture containing liq. atropinæ sulphatis (2 minims to the dose) quartis horis, to check glandular activity, and told him to come up the following evening. He did so, and mention may be made in passing, how very susceptible to atropine he was. After using the mouth-wash four or five times (the mouth being rinsed out with water afterwards), and taking five doses of the mixture, he had widely dilated pupils, blurred vision, giddiness, and epistaxis.

The mouth was slightly sore after passage of the sound, so I decided not to do this again (more especially as the breath was rather foul), for fear of introducing infection or structurally injuring the duct, and so causing stenosis. What little saliva was present in the mouth was still of an acid reaction; therefore it was thought that by adjusting the reaction of the saliva, one might expect the viscidity to diminish and the signs to abate. With this idea he was put on 5-gr. tabloids of soda bicarb., two to be taken every hour, and told to come up the following day.

Twenty-four hours later, the swelling in the submaxillary region was distinctly smaller, gave rise to less pain, and was not so tense, and even the man himself noticed increased fluidity of the saliva. Patient complained, however, that whereas he had been quite easy from other trouble, the molar on the right side of the lower jaw had kept him in agony during the night, and was giving him great pain then. There was considerable swelling now over the side of the face, and I thought it probable that the man had some mischief round the roots of the molar. I advised removal, therefore, and he consented. As the tooth was withdrawn it was followed by a quantity of stinking pus.

Next day the whole swelling was much smaller. Patient had no pain; and as the swelling on the floor of the mouth had considerably diminished, so had the inconvenience it gave rise to.

A fortnight later, all that could be seen was slight swelling over the right horizontal ramus of the lower jaw.

REMARKS.—The first appearance of the inside of the mouth suggested a ranula, but the rapidity of the history quite put that out of count, and one had no difficulty in seeing that there was some obstructive condition of the left duct and perhaps a slight amount of the right. It must be remembered the patient got up in the morning with this swelling, and on consulting me had made no effort to take food other than milk. The fact that what was at first the larger swelling should disappear under the influence of a meal, suggested that one of two things, or both, happened. Either (*a*) the pressure behind the obstruction was sufficiently great, and the obstruction perhaps (not tightly impacted) sufficiently near the orifice, that it was forced out; or (*b*) with an increased blood supply to the gland, as the quantity secreted increased, the viscidity diminished, and that which clogged the lumen was washed out; or (*c*) a combination of the two took place. The acidity would decrease as the quantity increased, and there may have been to some extent a solvent action. I feel certain calculus was out of the question, for it would either have been felt in the course of the duct or at the orifice; or it would have been demonstrated by the sound.

It was the reaction of the saliva that led me to administer the soda bicarbonate, with the idea that by rendering it alkaline I should exercise a solvent effect on the obstruction. The result shows that this belief was justified.

Then there was the alveolar mischief complicating. Had the case only been seen at a late stage, when this trouble was in full swing, it might easily have been mistaken for pure alveolar trouble, whilst the patient's statements, about first having a swelling on the other side of his mouth which disappeared, might not have received the attention it deserved. With a careless examination the submaxillary swelling might have been mistaken for enlarged lymphatic glands.

The history of the lumps occurring in boyhood and upwards seemed to point to previous occurrences of a similar kind, though of what precise nature it is hard to say.

One might here mention that the old idea of a ranula, as some obstruction to Wharton's duct, could scarcely be correct, since ranulas are not often accompanied by such well-marked obstructive changes.

PERICARDITIS AND ULCERATIVE ENDOCARDITIS, SECONDARY TO EMPYEMA.

By JAMES F. GEMMEL, *County Asylum, Lancaster.*

CASE.—The patient, a woman, æt. 46, was admitted here about three years ago. Though rather delicate-looking, her general health during that time had apparently been fairly well maintained; at all events, she had never been seriously ill until April last, when she complained of a severe pain in the left side of the chest. Examination revealed well-marked pleuritic friction, enlarged heart, and a murmur of mitral regurgitation. The percussion note over both lungs was clear, and the respiratory murmur—except over the left lung, where it was generally weak—presented no marked deviation from the normal. The temperature was 104° F., and urine normal. Such, briefly, was her condition at the time referred to. As the case from commencement to finish occupied a period of three months, no serial record of its progress will be made, but only a general survey, with allusions to special features of interest which it possesses.

During the first two months there was fever of an irregularly intermittent type, associated towards the end of that period with attacks of shivering. Throughout there was a slight cough, but never such as to cause much annoyance, and expectoration consisted of a clear, frothy, very liquid sputum. Œdema of the feet and legs gradually supervened, and the extremities of the second, third, and fourth toes of the right foot became affected with dry gangrene. The big toe of the same foot was similarly threatened, but the asphyxia gradually disappeared. Bitter complaint was made of sensations of burning and formication in the toes and sole of the affected foot, and various expedients were adopted by the patient, such as hanging her legs over the edge of the bed, with a view to obtaining relief.

The physical signs in the left chest indicated a gradual effusion of fluid, confined to the lower half of the pleural sac, and moist crepitations accompanied the feeble respiratory murmur in the upper portion of the lung behind. The temperature was now practically normal, and the urine healthy.

The diagnosis of a purulent pleurisy, secondary to chronic tuberculosis of the lung, was confirmed by an exploratory puncture. An incision was accordingly made in the sixth intercostal space a little in front of the scapular line, and exit given to a large quantity of odourless pus. The cavity of the pleura was then washed out with a warm solution of borax, and a long drainage tube inserted. For some days there was no unpleasant odour from the discharge, but eventually it became unbearable, and had that characteristic fœtor suggestive of disintegrating and putrid lung tissue. On the morrow following the operation the urine was loaded with blood, and of a bright port-wine colour, changing in the course of a week to a smoky tint. Epithelial and blood tube-casts were abundantly present, as also albumin. The reaction was now, and remained to the end, slightly alkaline. A bacteriological examination of the urine, kindly made for me by Dr. Erskine, showed the presence of tubercle bacilli and swarms of monococci, diplococci, and staphylococci. The following day a well-marked extensive pericardial murmur was discovered, and superadded to the mitral systolic was a mitral diastolic murmur. The patient died about a month later.

NECROPSY.—*Right pleura.*—Old adhesions at the apex.

Left pleura.—In the upper part the two layers are thickened and firmly adherent; elsewhere they are separate, but rough and nodular, much thickened, and covered with a purulent deposit.

Right lung.—Voluminous and healthy.

Left lung.—Is compressed, and almost airless. The greater part of the lower lobe is completely broken down, and is represented by a putrid diffluent mass. The upper lobe is fibrous, and infiltrated with an ichorous fluid and some putrid pultaceous nodules.

Pericardium.—Adherent to the left pulmonary pleura, and contains a hæmorrhagic effusion. Both layers are thickly covered with a rough fibrinous exudate, specially abundant at the origin of the vessels.

Heart.—Is enlarged, flabby, and dilated, and weighs 12 oz. Both ventricles, and more especially the right, are fatty. Borders of the mitral cusps fringed with friable warty vegetations.

Spleen.—Is engorged, weighs 4 oz., and exhibits a yellow infarction about the size of a pigeon's egg.

Liver.—Weighs 44 oz.; is soft, friable, and nutmeg.

Kidneys.—Right and left weigh 6 and 6½ oz. respectively. Both are of a dirty greyish green colour, and the surface is granular on removal of capsules which are adherent.

REMARKS.—Before discussing the diagnosis of the case, I wish to remark, in passing, upon the difficulty often experienced in conducting a physical examination in the insane, together with the absence or unreliability of anything approaching a history. Beyond this statement it is not my intention to go, as I have in a recent number of the *Lancet* entered more fully into the question. The present case has been selected, not with a view to illustrate any special opposition on the part of the patient to physical examination, but on account of the supervention of serious cardiac and renal developments. The acute affection of the pleura was complicated from the outset by antecedent cardiac disease, benign, and apparently of some considerable standing, as examination at the time showed. It was not until the second day after incising the pleura that pericarditis and a mitral diastolic murmur were detected. As the heart was only examined at irregular intervals, it is of course manifestly impossible to affirm with any degree of certainty when these complications first appeared. That, however, they were of fairly recent development, may be taken for granted, for the appearance the day previously of blood and tube-casts in a hitherto normal urine, following upon an earlier complaint of pain in the lumbar and splenic regions, pointed to the advent of some acute complications. The combination of the signs and symptoms thus presented led me to believe that there was a direct extension to the pericardium of the inflammatory process in the pleura, as also a general septic condition resulting in ulcerative endocarditis, septic nephritis, and embolism of the spleen. Unfortunately, neither the pericardial nor endocardial exudates were examined bacteriologically, but there is sufficient evidence otherwise to warrant the assumption that the former was tuberculous. First and foremost, there was a tuberculous pleurisy, and post-mortem examination showed inflammatory adhesion between the pulmonary pleura and the external surface of the pericardium. Again, the sero-sanguinolent character of the effusion pointed to this origin, and at the same time practically put out of court any question of the pericarditis being due to septic organisms from the empyema, in which case the exudate would have been purulent.

The ulcerative endocarditis I am inclined to attribute to the empyema, and is to be regarded as septic. Unmixed tuberculous infection of the endocardium, as seen in chronic phthisis and acute general miliary tuberculosis, is slight and non-ulcerative. Had the vegetations on the valve contained miliary tubercles, evidence of this would have been apparent in some of the other viscera. The acute nephritis was also evidently septic, and depended more, I think, upon a general absorption of septic substances from the putrid empyema, than upon the ulcerative endocarditis, as there was no evidence in the kidneys of infarctions or pyæmic abscesses.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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Encyclopedia Medica.—Under the general editorship of CHALMERS WATSON, M.B., M.R.C.P.Ed. Vol. I. "Abdomen to Bone." Edinburgh: William Green & Sons. 1899.

THE above is the title of the first volume of an undertaking announced by the publishers to be "by far the most useful work of reference in existence"; "a complete and authoritative medical library in itself, covering the entire field of medicine, midwifery, and surgery," not only containing, "in a more accessible and convenient form, the matter to be found in existing treatises and systems of medicine and surgery, but much information which is not to be found in such works."

There has been no lack in recent years of important treatises and systems of medicine and surgery. The great work on medicine, edited by Professor Clifford Allbutt, the "Twentieth Century Practice of Medicine," and various treatises on surgery, midwifery, and gynæcology, have recently come out in rapid succession. The present work lays claim to be better than all of these, and the reader's expectations are therefore high.

We have spent considerable time in the careful study of the present volume, and feel that we can form no final idea of the proper value of the work, as a whole, from this instalment.

There are defects in the present volume which may possibly be remedied in those which are to come. The principal faults we have noticed are those of omission and of arrangement, together with too great brevity in some directions and too much diffuseness in others. A work of this kind should combine the advantages of a dictionary with those of more systematic works, and should contain a considerable number of short articles, as well as those of greater length, on the more important subjects.

The arrangement of the articles in the work is, we think, open to many objections. In the prospectus it was stated that the arrangement would be alphabetical, as undoubtedly the best for ready reference, but that, in order to save repetition, the more important subjects would be grouped under main headings, as far as possible, and a careful system of cross-references would be introduced. An alphabetical arrangement loses nearly all its value if the articles do not appear under the headings which one would naturally expect for them. The only two articles which one could be absolutely certain of finding in the present volume are those on Abdomen and Bone. We assume they are there, because these words appear on the back of the volume. A complete and exhaustive index is promised, and, if the articles are arranged in future volumes as they are in this, the first of the series, it will always be wise, if not indeed absolutely necessary, for the reader to consult the index first, in order to ascertain where to look for the information he is in search of.

We look up Aneurysm, and we find an interesting article on the subject, but we perhaps specially wish to study thoracic or abdominal aneurysm, with which the article does not deal, and no reference is given to any articles on these special forms of aneurysm. As we have gone through the whole volume, we know that articles on thoracic aneurysm and on abdominal aneurysm are contained in it, which makes it all the more surprising that they are not collected at one place. Thoracic Aneurysm appears under the heading, Aorta (Thoracic), Aneurysm and Dilatation of, while Abdominal Aneurysm follows Abdominal Abscess. We look up Atheroma, and we are referred to Vessels, diseases of. We wonder who would think of looking up Vessels, in the first instance, for a description of Atheroma and Arterio-sclerosis.

Among articles which might reasonably be expected to be treated under the headings mentioned, are the following:—

Abscess (see Suppuration), Acids and Acidity (see Digestion, Blood, and Urine), Acclimatisation (see Climate), Aconite (see Toxicology), Addison's Disease (see Adrenal Glands), Adenoid Growths (see Nose), Aero-therapeutics (see Therapeutics), Ageusia (see Taste), Agraphia (see Aphasia), Albuminuria (see Urine), Aleppo Boil (see Furunculus Orientalis), Alkaptonuria (see Urine), Amenorrhœa (see Menstruation), Amnesia (see Memory), Amputations (see Operations), Amyloid Disease (see Lardaceous Disease), Angina Ludovici (see Neck), Angioma (see Tumours), Ankylostomiasis (see Parasites), Anosmia (see Smell), Anthrax (see Malignant Pustule), Aphonia (see Voice), Aphthæ (see Stomatitis), Apoplexy (see Cerebrum), Ascarides (see Parasites), Aspergillosis (see Lungs), Ataxia (see Equilibrium), Atelectasis (see Lungs), Atheroma (see Vessels), Azoturia (see Urine), Bacteriology (see Micro-organisms), Bilharzia Hæmatobia (see Parasites).

Among headings to which there is no reference at all are the following:—

Absorbents, Acarus, Achromatopsia, Acupuncture, Acute Yellow Atrophy, Aegophony, Agalactia, Agoraphobia, Albuminoid Disease, Albumins, Albumoses, Alteratives, Amœba, Amœbic Abscess, Amœbic Dysentery, Anæsthesia (independent of anæsthetics), Analgesia, Anasarca, Anazoturia, Acids, Antisialagogues, Aperients, Asiatic Cholera, Auscultation, Blisters.

There is no consistency in the arrangement. If Aphonia and Anosmia are to be considered under Voice and Smell, why is Aphasia not considered under Speech, and Agraphia under the heading of Writing. If Amputations are to be considered under the heading of Operations, why should the ligature of arteries not also be considered there instead of under Arteries (Injuries of, and Ligature of).

Among other articles which appear to us out of place in their present positions, are Adolescent Insanity and Alcoholic Insanity, which would better come under the heading Insanity; and the article on Auditory Nerve and Labyrinth, which would more appropriately come under Ear. We do not, for all these reasons, consider that the work will prove very convenient for reference.

In the prospectus, it was announced that special attention would be paid to bibliographical references. Opinions will vary as to the utility of giving references at all in a work of this description. Still, as it has been decided to give them, it would have been desirable to have secured greater uniformity. To most of the articles a few references are added, under the heading of Literature. These are, for the most part, quite inadequate for the purposes of the reader who desires to study the subject thoroughly for himself. In some instances the references given might, with advantage, have been omitted. The references to foreign literature are particularly weak. We may say, however, that in some cases the reader's attention is drawn to works in which useful bibliographies are to be found. We would add that, by the systematic use of the contractions used in the *Index Medicus*, a certain amount of space might have been saved.

The illustrations in the volume are few, and the work would have suffered very little by their omission. The illustrations of urinary calculi and of normal blood are, however, well executed.

We should like to point out that it would have been a considerable advantage had the authors' names been appended to the articles, as is usual in works of this description. As it is, it is necessary to consult a table at the beginning of the volume to discover who the authors of the various articles are.

The first article in the volume is a short account of the Clinical Investigation of the Abdomen, by Dr. Judson Bury. It is a useful sketch of the subject; but in a work of such magnitude as the present, more space might very well have been devoted to it. The same remark applies to a second article by the same writer, a little further on, dealing with the subject of Abdominal Tumours.

Abdominal Injuries are carefully and clearly considered by Professor Swain of Bristol, under the three divisions of Contusion, Wounds, and Traumatic Peritonitis. Professor Swain also writes on Abdominal Abscess, though why he should limit his attention to retro-peritoneal abscess, and abscess in the abdominal wall, is not quite clear.

The next article is on Abdominal Aneurysm, by Professor Dreschfeld. As abdominal aneurysm is discussed here, it should naturally follow that thoracic aneurysm would be discussed under Thorax; but we were surprised to find, as we have already pointed out, that it appears in the present volume under the heading Aorta (Thoracic), Aneurysm, and Dilatation of. Under the heading of Aneurysm itself there is a good article by Mr. Stanley Boyd, in which the subject is considered mainly from a surgical point of view. It is a mistake that no reference, as far as we see, is given in it to the articles on Abdominal and Thoracic Aneurysm. Aneurysm of the Innominate Artery and Aneurysms of the Pulmonary and Cerebral Arteries receive merely passing reference. It would obviously have been an advantage if Aneurysm had been discussed in one place in its whole medical and surgical aspects. It seems an unnecessary and inexpedient division of the subject to have assigned Abdominal Aneurysm to one writer and Thoracic Aneurysm to another.

Dr. Graham Steell is responsible for the articles on Aorta (Thoracic), Aneurysm and Dilatation of. We cannot but consider both the articles on Aortic Aneurysm as too condensed. Perhaps had they been considered by one author, space might have been saved, and unnecessary repetition avoided. We regret that neither physician gives us his views as to the value of Röntgen-ray examination in the diagnosis of internal aneurysm.

In Professor Dreschfeld's article there is a notice of Lancereaux's method of treatment of aneurysm by subcutaneous injections of gelatine. It will, however, puzzle many readers to interpret the meaning of "the subcutaneous injection of about 200–2·250 cbc. of a sterilised 3 per cent. watery solution of gelatin." It is perhaps as well that the meaning is obscure, considering the great care which is essential to the employment of this treatment, and the doubtful value which it possesses.

Dr. John Thomson's article on Achondroplasia, though short, puts forward clearly the main features of this curious fœtal disease, of which a few years ago one of the first descriptions in this country was given by the same writer in the *Edinburgh Medical Journal*. Acromegaly is succinctly described by Dr. Dreschfeld. Professor Delépine gives an adequate account of Actinomycosis.

The Physiology and Pathology of the Adrenal Glands are ably discussed by Dr. H. D. Rolleston, who contributed the corresponding article to Allbutt's "System," to which the reader is referred for further information. We do not quite follow him, however, when he says that "the possibility arises that by a rise of blood pressure after adrenal feeding, patients with the disease (*i.e.* Addison's disease) might be distinguished from healthy persons." We are irresistibly reminded of the interview between the poet and Dr. Benjamin Franklin, who, doubtless, had he flourished at the present day, would have fed the poet on adrenal glands, and then "fastened a machine to the pulse that marked all the beats on a sheet of paper—for all the world like a scale of the heights of mountains, say from Mount Tom up to Chimborazo and then down again."

The article on Adolescent Insanity is from the pen of Dr. Clouston, and is an interesting essay; but it would certainly have found a more appropriate place under Insanity. There is no article on Adolescence, and surely this age has some other features of importance besides insanity.

Alcoholic Insanity and Alcoholism are both well discussed by Dr. George Wilson, and it is quite fitting that they should be considered together. But apparently there are to be further articles on the subject under the headings Mania à Potu, Delirium Tremens, Insanity, and Dipsomania. Alcoholic Paralysis might well claim to be considered in this place also.

The article on Alcohol by Dr. W. Ewart is full of valuable and trustworthy information, and the directions as to therapeutic uses are sensible and to the point.

Dr. L. Gulland gives a clear and useful account of Anæmia and Pernicious Anæmia.

A most interesting series of papers on Anæsthesia and Anæsthetics are contributed by Dr. Dudley Buxton, Professor Ogston of Aberdeen, and Mr. Pridgin Teale of Leeds. Professor Ogston discusses Chloroform Anæsthesia, and considers that its advantages outweigh its disadvantages. Mr. Teale, strongly impressed with the much greater safety of ether, tries to explain why it has not universally won its position as the routine anæsthetic. Both articles are well written, and well worth perusal.

It is fitting that Dr. Lauder Brunton should write on Angina Pectoris, and his short article is evidently the outcome of a large clinical experience of the disease.

Injuries and Diseases of the Ankle Joint are fully considered by Professor Thomas Jones and Mr. J. E. Platt, both of Manchester.

Dr. Byrom Bramwell contributes an interesting essay on Aphasia.

The important subject of Diseases of the Vermiform Appendix is treated by Professor F. J. Shepherd of Montreal. We are surprised to read that Dr. Shepherd in his long experience has never yet seen, either in the dissecting-room or operation theatre, such a thing as a loaded cæcum. We agree with him, however, that the swelling in the right iliac fossa is not usually due to a fæcal accumulation. Dr. Shepherd is not an extremist with regard to operation, but advises that after two attacks the appendix should be removed. He says, "the fear of an attack keeps the patient in continual dread; he is unwilling to leave home, dreading he may have an attack when out of reach of skilled surgical assistance." We cannot say that we have ever met with a patient who showed any such perturbation of mind, and we consider that there is no reason why a man who has passed safely through two attacks should worry himself unnecessarily about the future.

Mr. H. F. Waterhouse writes clearly on Injuries of and Ligature of Arteries.

Dr. H. P. Hawkins contributes a short but extremely lucid and well arranged article on Ascites.

Antiseptic Surgery and the Aseptic Treatment of Wounds are discussed by Mr. C. B. Lockwood, who clearly enunciates the principles and practice of modern surgery.

Other interesting and important articles, which space forbids more than mention, are those on Asthma by Dr. D. J. Leech; Diseases of Auditory Nerve and Labyrinth by Dr. Dundas Grant; Balneology by Dr. Fortescue Fox; Injuries and Diseases of Bladder by Mr. F. A. Southam. The concluding article on Diseases of Bone, by Dr. Alexis Thomson, strikes us as one of the best in the volume, containing as it does a very original and exceedingly well-arranged description.

Whether the work, when completed, will fulfil all that the publishers have led us to expect of it, we are of course not at present in a position to say; but from what we have already stated, it must be evident that much room is left for improvement in the editorial department.

HECTOR MACKENZIE.

A System of Medicine by many Writers. Vol. vii. Edited by THOMAS CLIFFORD ALLBUTT, M.A., M.D., F.R.S. London: Macmillan & Co. Ltd. 1899.

IN the preface to the seventh volume the editor states the reason which induced him to extend the work from six to eight volumes. While the augmentation of any treatise beyond its original limits has disadvantages, it may chance that curtailment would prove the greater evil. Thus it would have been in the present case. Probably few subscribers to this work will complain of the extension. It would obviously have been impossible to include so wide a range of matter within narrower limits.

The seventh volume presents such a large amount of material condensed and compressed into small space, mostly by writers standing each in the forefront of his own department, that the task of the reviewer who desires to give a fair and complete, and at the same time a reasonably interesting report, is not only difficult and laborious, but one which sometimes brings before his mind his own ignorance. This is naturally an unpleasing admission, for every reviewer *ex hypothesi* possesses all knowledge, knows all mysteries, and understands every new and original investigation far better than the man who made it. There is no doubt that the perusal of a work like the present is highly instructive to the reviewer, whatever the following remarks upon it may be to the readers of this Journal. The interest of the articles necessarily varies with the amount of progress which the several subjects have recently made or are making.

Dr. Frederick Taylor commences the group of diffuse diseases of the spinal cord by a careful discussion of myelitis, acute and chronic, in its several varieties. Dr. Andrew Smith of New York succeeds with an article on caisson disease, in which he narrates the singular effects produced on the nerve-centres by sudden falls of atmospheric pressure. The pathology of the condition does not appear to have been as yet fully elucidated, but an important means of relief has been discovered, namely, subjecting the patient, as soon as alarming symptoms occur, to a pressure of two or three atmospheres, which is then very gradually reduced to the normal.

Dr. Batten's paper on the hæmatomyelia or hæmorrhage into the cord, a condition which is always liable to be mistaken for acute myelitis or poliomyelitis, completes the consideration of the diffuse diseases of the cord. To it succeed accounts of the special or limited morbid conditions of that structure, beginning with insular sclerosis, to which Dr. Risien Russell devotes forty-four pages. He discusses the etiology fully, and points out the multiform character of the disease and the great number of aberrant cases which occur.

The question of the real histological nature of the plaques, whether primarily interstitial, or arising in the myelin sheath of the neuron, or whether having in the first instance a vascular origin, remains undecided.

Drs. Mott and Ormerod supply a clear and interesting account of the afferent, efferent, and associated systems of neurons affected in tabes dorsalis. The results of section of posterior roots in the monkey, in producing loss of tonus and inco-ordination, give further evidence that degeneration of Goll's column is one influential cause of the symptoms, but there appears to be a psychical element as well. The degeneration of the plexus round the cells of Clarke's column also stops the access of sensory impulses from the feet to the cerebellum.

In the department of therapeutics, the authors notice the value and importance of drugs of the antipyrin class in relieving the lightning pains; these the present writer has often found enable him to avoid morphia or suspension.

Sir Thomas Grainger Stewart gives a full and practical summary of ascertained facts regarding spastic paraplegia, ataxic paraplegia, Friedreich's ataxia, and the rare hereditary cerebellar form, as well as of various less important subdivisions.

Professor Allen Starr of New York describes syringomyelia, a disease fortunately not very often seen, characterised by analgesia, thermic anæsthesia, trophic disturbance, and progressive muscular atrophy.

After shorter papers on amyotrophic lateral sclerosis by Dr. Beevor, and on senile paraplegia by the editor, we pass on in order to the nuclear diseases, and here Professor Allen Starr again attracts the reader by his interesting detailed account of the precise anatomical seat and characters of the lesion causing infantile paralysis. After speaking of the prevalence of the disease in the hot months of the year, he ends with many sensible suggestions as to treatment which will be welcomed by the practitioner.

Dr. Beevor follows with an account of the chronic form of anterior poliomyelitis, the familiar wasting palsy, and with a history of the various forms of bulbar paralysis.

Preliminary to the important sections of diseases of the cerebrum, Dr. Leonard Hill contributes a highly interesting paper on the experimental pathology of the cerebral circulation. Enclosed in an unyielding box as the brain is, it seems established that intracranial pressure is equivalent with cerebral venous pressure, and varies directly with it. Under ordinary conditions, variations in general arterial pressure do not influence the blood quantum, but only its velocity. Notwithstanding this great peculiarity of the intracranial circulation, it is remarkable how little cerebral function is interfered with by a complete change in these conditions. The writer of this notice has observed brain function in man proceed normally for years when the whole of the vault of the skull had been removed.

Mr. Leonard Hill, as a result of his own work, and that of Mr. Bayliss, considers that no evidence exists of cerebral vasomotor nerves, and that the cerebral circulation follows passively the changes in general arterial and venous pressure. Though the evidence may at present seem to point to this conclusion, it is difficult to believe that the muscular coats of the cerebral arteries have not some important function, that some at least of the nerves seen in these coats are not vasomotor, and that an organ with so many varied and complex functions, psychical, visual, auditory, tactile, phonative, and motor, and the power of specialising on any one, has not a vasomotor centre (as yet undiscovered) which directs its blood stream to the region where work is being done. Moreover, Dr. Carl Huber's discovery of the termination of nerve-fibrils in the muscular coat of the cerebral vessels is important evidence *per contra.*

Professor Ferrier devotes 120 pages to an exhaustive summary, from physiological, pathological, and clinical sources, of the knowledge thus far accumulated on the regional diagnosis of cerebral disease. It would have been difficult to find a writer more fitted for the task, or to conceive it more efficiently performed. One can only repeat this opinion in reference to Professor Charlton Bastian's paper on aphasia and other speech defects. The article is illustrated by various schemata of word-centres and their connections. The present notice would be endless, if the writer allowed himself to remark upon the many points of interest which occur in reading this and other articles, but he may venture to point out how close is the bearing of this subject on educational problems, how important it shows the training of the special senses to be, how much the intellectual vigour of those individuals is augmented who are good visuals and auditives.

In the present paper, which, however, is only an abstract of Dr. Bastian's work published elsewhere, no mention is made of attempts to educate both sides of the brain by employing right and left hand equally in drawing, writing, etc. The functional disabilities of speech to some of which he alludes are curious, such as the word-blindness, and aphemia which occur sometimes in attacks of migraine, or the complete temporary aphasia from nervousness, which the writer has a few times seen in medical students at an oral examination.

This paper is followed by a short article by Dr. Colman, on impediments of speech, in which Dr. John Wyllie's excellent work is acknowledged.

The subject of concussion is next treated by Mr. W. H. Bennett, and stress is laid on the importance of care and treatment in slight cases. Then follow Drs. Barlow and Lees on tubercular and simple meningitis. The discovery of a diplococcus in the exudation of the latter is a hopeful event. If it prove to be the cause, and if an antitoxin be supplied, these cases may in future bear a lower mortality than at present.

Mr. Ballance follows with a paper on certain affections of the ear bearing on cerebral disease.

Dr. Tooth deals in an interesting manner with the somewhat vague and difficult subject of cerebral hæmorrhage, and is followed by Dr. Byrom Bramwell on abscess and tumour of the brain. In regard to the latter, Dr. Bramwell points out the palliative use of trephining, also the value of considerable doses of potassium iodide and mercury with the same object. Probably the great mitigation of suffering obtained by the use of these agents, and also by the use of small blisters, applied to the occiput or elsewhere adjacent to the painful region, is scarcely yet fully realised by the profession.

After a notice of intracranial syphilis by Drs. W. A. Turner and Bullock, comes a paper on general paralysis of the insane by Drs. Goodall and Savage. Regarding it as a general break-down of the nervous system, which may begin at any point, and hence manifests infinite variation in symptoms and course, they point out the influence of syphilis, of the wear and worry of city life, and of free living in its causation, also its great rarity in a purely agricultural population. Pathologically there is little more as yet to be said than the old story of increased glia, decay of neurons, lymph stasis, probable formation of toxins, and auto-intoxication. These are sad and hopeless cases, which always reiterate the ancient precept, "Live simply and according to nature."

Papers on infantile cerebral degeneration and cerebral paralysis, and one on the disorders of sleep, follow.

Sir Wm. Gowers supplies a full analysis of the causes and nature of epilepsy, and a strong commendation of its treatment by bromides.

Dr. Ernest Herman's paper on puerperal eclampsia is interesting, among other respects, in regard to the relation of the disease to Bouchard's observations. It contains much that will arrest the attention both of physician and gynæcologist.

In perusing the article on chorea by Dr. Risien Russell, the reader, especially if he has seen much of the disease, will feel that some great generalisation is yet to be made associating the disease with rheumatism, probably attributing both to an infective cause and perhaps to a mixed infection.

The volume terminates by articles on the varieties of habit spasm, which Dr. Risien Russell denominates by the somewhat questionable title of "The Tics," and by short notices of other minor spasmodic affections, such as paramyoclonus multiplex and eclampsia nutans.

It is difficult to speak in too high praise of the entire volume.

Richard Caton.

A Manual of Surgical Treatment. By W. Watson Cheyne, M.B., F.R.C.S., F.R.S., and F. F. Burghard, M.D., M.S. (Lond.), F.R.C.S. In Six Parts. Part I. "The Treatment of General Surgical Diseases." London: Longmans, Green & Co. 1899.

This is the first volume of a work on "Surgical Treatment" in six parts. It makes no pretence to be a complete encyclopædia of surgery, embracing, in addition to treatment, pathology, symptomatology, and diagnosis. To quote from the authors' preface: "We have assumed that the reader is familiar with the nature and diagnosis of disease, and we only refer to the pathology and symptoms in so far as it is necessary to render intelligible the principles on which the treatment is based, and the various stages of the disease to which each particular method is applicable. While many surgeons will regret that the senior author, who is admittedly one of the leading authorities on surgical pathology and bacteriology in this country, should not have given more fully his views on the many vexed questions of surgical pathology, we must bear in mind that the book is written as a manual of surgical treatment, and only as such must be judged.

It may at once be stated that the authors have achieved a large measure of success in the difficult task upon which they have embarked, and that if the succeeding parts maintain the high degree of excellence which characterises this volume, Messrs. Cheyne and Burghard will have given to the profession a work which will have filled a distinct want in surgical literature. The chapters on inflammation, acute suppuration, ulceration, gangrene, wounds, and infective diseases of wounds, are all exceedingly well done and thoroughly practical. They present nothing that can be made the subject of criticism. In pyæmia, tepid sponging is recommended, to be repeated whenever the temperature rises above 102° F.

In cutaneous erysipelas we are told that Kraske's method of making numerous small scarifications in the skin at some distance beyond the spreading age of the erysipelas, is by far the most effectual plan of treating erysipelas, and with this we think that most surgeons who have given the method a fair trial will agree. Chapter xii., "Syphilis," strikes us as being too brief, though it is only fair to add that the treatment of the various lesions in the different tissues and organs, in so far as they call for special treatment, is reserved for future parts of the work. In this chapter reference to the treatment of syphilis in general is alone undertaken. Our authors condemn excision of the chancre, without giving their reasons. We think most surgeons will agree with Fournier that there are certain cases in which, within two or three days of its appearance, excision of a chancre is indicated—certainly at the urgent request of the patient, to whom the pros and cons have been fully explained.

We note with pleasure that the use of mercury before the appearance of secondary symptoms is condemned, except in special cases, and that really large doses of iodide of potassium are recommended in treating tertiary syphilis.

In Chapter xiv., "Tuberculosis" is discussed in less than nine pages, and though there is no fault to be found with the chapter, as far as it concerns the treatment of tuberculosis, we cannot but regret that the account of the pathology is so brief, the more so as the senior author is one of the highest authorities on surgical tuberculosis. A chapter on "Tumours" concludes the volume.

We shall look forward with pleasure to the appearance of the other volumes of the work, and should they maintain the high standard of volume i., the authors will have produced a work which will be a credit to British surgery. HERBERT F. WATERHOUSE.

Intestinal Obstruction, its Varieties, with their Pathology, Diagnosis, and Treatment. By FREDERICK TREVES, F.R.C.S. London: Cassell & Co., Ltd. 1899.

TREVES' "Intestinal Obstruction," published in 1884, at once became the text-book on this important subject, and was a work with which no surgeon could afford to be unfamiliar. We welcome, therefore, the appearance of this new, revised, and almost entirely rewritten edition. Fifteen years of wondrous progress in intestinal surgery have passed since the first edition was published, and this work written by one who has had no small share in this progress, whose judgment is acute and reliable, who knows thoroughly the literature of the subject, and whose experience in this branch of surgery is perhaps greater than that of any other surgeon, has an authority which is beyond question.

The work is divided into three parts—(1) "Pathology and Morbid Anatomy," (2) "The Clinical Manifestations," (3) "Treatment." Part 1 is responsible for half the volume, Part 3 for one-fifth only; the remaining portion of the work is occupied by Part 2. The apparently rather small division allotted to treatment is explained by the fact that the author has "refrained from introducing the actual details of the various operations, since such matters are very fully discussed in the text-books on operative surgery."

One of the most interesting chapters in the book is on internal herniæ, in which are given clear descriptions of diaphragmatic hernia, hernia into the fossa duodeno-jejunalis, hernia into the foramen of Winslow, intersigmoid hernia, pericæcal hernia, subcæcal hernia, and hernia into the ileo-cæcal fossa, with illustrations of almost all of these conditions. Chapter vi., on "Intussusception," is also an excellent account of the pathology of this condition, and is very well illustrated. It appears that in no less than 52 per cent. of cases of intussusception there is no evident exciting cause, that polypi and diverticula account for 8 per cent., ingesta for 15 per cent., and that diarrhœa, dysentery, enteritis, and marked irregularity of the bowels, taken together, act as exciting causes in only 8 per cent. of all cases.

Part 2, "The Clinical Manifestations," fulfils its purpose well, and gives as clearly as possible the points of differential diagnosis.

It is to Part 3, however, that the reader naturally turns with anticipation, to discover what Mr. Treves' rich experience teaches in many at present unsettled questions of treatment. We have only space for a few quotations. "Morphia is an absolute necessity in acute intestinal obstruction, and should be administered with as little delay as possible." "The value of opium in the treatment of intussusception can scarcely be over-estimated." In acute intestinal obstruction, "the question of feeding does not arise. The patient should be starved, not fed." If he dies, his death will most probably be due to the absorption of poisonous material from the loaded bowel." "There is an overwhelming prejudice among those who practise domestic nursing in favour of constantly plying the sick with food." "Among those measures which may be condemned as harmful, are massage of the abdomen and abdominal taxis, including, if need be, the inversion of the body." "The one perpetually reiterated comment upon the fatal cases of laparotomy, performed for acute obstruction, is this, 'The operation was performed too late.'"

In acute intestinal obstruction, "operation is too often regarded as a *last* resource. It should be regarded as the *first* resource, as it certainly is the *only* resource." "The incision should be made in the median line; . . . . experience is decidedly against the making of the incision over the supposed seat of the obstruction." The above quotations will suffice to give an idea of the delightfully clear and authoritative teaching of the author. Mr. Treves may be heartily congratulated upon having in this work given the best description of the pathology, diagnosis, and treatment of intestinal obstruction that has yet been written.

HERBERT F. WATERHOUSE.

Medical and Surgical Reports of the Boston City Hospital. Edited by Drs. BURRELL, COUNCILMAN, and WITHINGTON. Tenth Series. Boston, U.S.A. 1899.

THE most interesting contributions to the tenth series of these reports probably are those which have to do with the types of disease presented by from 400 to 500 returned soldiers from Cuba. As their numbers exceeded the available space in the hospital, the majority of them were housed in tents pitched on the hospital lawn. These were replaced as the weather grew cold by polling-booths, and by the time the frost and snow of winter set in, the number of soldier-patients had diminished so far as to allow of the admission of the remainder into the regular wards.

Papers by Drs. H. Jackson and Withington deal with the types of disease occurring among the returned soldiers; these were to a large extent types of æstivo-autumnal malaria, and, in several, clear instances of the possibility of coincident malaria and enteric fever,—a coincidence strongly denied as ever occurring by some authorities. Valuable communications upon scarlet fever are made by Drs. M'Collom and Pearce. Dr. Arnold discusses the weight of the normal human heart, arriving at 290 grm. and 260 grm. as the average in males and females respectively (9·3 to 8·3 oz.). Dr. Bullard records a case of syringomyelia with glioma of the cord, in which laminectomy was performed, followed by septicæmia and death. Altogether the reports are well worth study, and reflect credit on the staff of the hospital from which they come.

A. Lockhart Gillespie.

The Diagnosis of Disease. By J. Porter Parkinson, M.D., M.R.C.P. (Lond.), F.R.C.S. London: Baillière, Tindall, & Cox. 1898.

We are afraid that this small volume can only be recommended as a good type of "how not to do it." It is arranged in a way which can scarcely lead but to confusion in the mind of the student. The advisability of briefly noting symptoms or signs in order, and appending here and there to one or other of them a few lines descriptive of some special disease, which frequently is more closely connected, pathologically, with lesions of a system quite apart from that under which the aforesaid signs are included, can only be regarded as doubtful. To give an instance, the sole description of exophthalmic goitre and its associated symptoms (except Stellwag's sign, which is not mentioned) is given in the second page of the text, because the thyroid gland may be seen to be enlarged on inspection. No other reference to this disease is made, as far as we can find, except that the rate of the pulse is elsewhere stated to be rapid in it. No note is made under the nervous system of the disease, nor of any of its symptoms. Similarly, myxœdema is tacked on to the outward appearance of simple œdema, a proceeding well calculated to lead the student astray with regard to the pathology of the disease. A note of the skin lesions is what is wanted under "general appearance," not a scanty tale of the general symptoms. It is scarcely worth while to consider the text further, when we find the auscultatory signs of pericarditis given as "a cantering action of the heart, heard by the stethoscope to be due to reduplication of the first or second sound," while later a "superficial râle" is frequently heard. No mention here of friction sounds, or of the common triple friction rub, the "cantering" misapplied above. Under pericarditis with effusion, a friction sound is noted as occasional. No mention of *pulsus paradoxus* here, or under adherent pericarditis.

Further on, an oxalate of lime deposit is likened to a slight cloud of mucus, cuprous oxide is deposited as a yellowish red turbidity, *skoda* becomes *skodia*, acromegaly is said to be most common in males, while in truth it is very much the reverse, etc.

A. Lockhart Gillespie.

RECENT ADVANCES IN MEDICAL SCIENCE.

MEDICINE.

UNDER THE CHARGE OF

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Exophthalmic Goitre.—Death from Exophthalmic Goitre along with Myxœdema.

Faure (*Presse méd.*, Paris, 23rd September 1899) notes eleven cases, already reported in medical literature, in which myxœdema and exophthalmic goitre were diagnosed as coexistent. These eleven cases can be placed under four categories:—(1) Four in which the exophthalmic-goitrous symptoms were episodes only during the course of myxœdema; (2) two cases of exactly the converse; (3) two instances of the diseases appearing and persisting simultaneously; (4) three others in which, during the course of either of these conditions, symptoms of the disease hitherto absent appeared, but not so fully as to present a complete clinical picture of it.

Exophthalmic goitre is ascribed to hypertrophy and over-function of the thyroid gland (Renaut, Joffroy, Möbius, etc.); myxœdema, on the other hand, to arrest or diminution of the secretion of this gland, a condition which may be developmental, due to surgical extirpation, congenital or acquired. If the one disease arises from over-activity, and the other from insufficient powers, of an identical gland, it is impossible that both can exist together in one subject.

Faure gives details of a case bearing upon the problem:—In 1886, Mdme. D., who was then æt. 32, had never suffered from any illness of consequence previously, and, as to her family history, showed no hereditary tendency to nervous or cardiac troubles, or to goitre, was attacked by palpitations, attributed by her to domestic trials. Three or four months later, exophthalmos appeared somewhat suddenly. At this period her character altered: she became peculiar and irritable. In 1892, six years after this, the symptoms noted above having remained *in statu quo*, swelling of the thyroid gland suddenly commenced, and increased rapidly, coincident with increase of the exophthalmos. She suffered much from diarrhœa. Two years later, dyspnœa set in, œdema of the ankles at night, insomnia, and, in fact, all the signs of cardiac insufficiency. In 1896, ten years after the onset of her symptoms, the patient was seen at the Salpetrière; fifty-two physicians had by this time treated her with bromides, electricity, and hydrotherapeutic methods. Lately new symptoms had developed. Her face and neck had been puffy and swollen for three months, accompanied with a diminution in mental power, memory, and activity; the preceding symptoms still remained, but had become less prominent since 1894. Her actual condition on examination showed thickened and hard skin over the face, considerable exophthalmos with slight nystagmus, carotid pulse visible, small hard non-expansile goitre, pulse 100 (strong and irregular), the heart enlarged but giving no murmurs, harsh respiratory sounds at each apex, and œdema of the ankles.

Treated with thyroidoin and thyroid gland, the patient improved somewhat; later, given digitalis, she improved still more, while the pulse, as high as 140 under the thyroid, fell to 100, and became regular. Under treatment she gradually lost flesh, the exophthalmos and goitre tending to disappear more completely than the other symptoms; in time, tetany developed, violent attacks of diarrhœa; finally, fainting fits and heart failure preceded death, which took place in January 1898, twelve years from the commencement of the symptoms.

The autopsy showed the heart to be doubled in size, but neither degenerated nor fatty. The valves were competent. Except that the liver, spleen, and kidneys were slightly congested, the only signs of disease elsewhere were found in the thyroid gland and skin of the face. The thyroid was treble the normal size, firm, and sclerosed; the skin of the face firm, thickened, not pitting on pressure. Histological examination of these organs yielded nothing further, while the basal ganglia and vagi were found healthy. The left and right sympathetic nerves in the neck were normal, but it was probable that the enlarged thyroid, from its position, had pressed upon the right sympathetic nerve during life.

Faure then discusses the various points presented by the case in relation to Graves's disease and by myxœdema, concluding that the state of our present knowledge is insufficient to base any definite judgment upon. All that could be said was—"That a female died from cardiac failure, because the heart muscle had been subject to incessant excitation for eleven years. During this time it seemed that the nervous mechanism of the heart had been disordered, while the autopsy showed that there was one possible cause for this disturbance—compression of the cervical sympathetic."

EXOPHTHALMIC GOITRE AS A MANIFESTATION OF HYSTERIA.

ROBINSON ("Étude sur le syndrome de Graves-Basedow considéré comme manifestation de l'Hystérie," Paris, 1899) was taught in Edinburgh that exophthalmic goitre is caused in most part by indiscretions committed by the thyroid gland; later on, in Paris, he was impressed by the teaching of authorities on the subject there, and by the powerful arguments brought forward by them to prove that the disease is purely a neurosis. He gradually saw his way to reconcile the two theories, that of Greenfield's teaching with that taught by Charcot's followers.

His conclusions are shortly:—Exophthalmic goitre ought to be ranked as a manifestation of hysteria. The neurosis originates over-active function of the thyroid gland, leading to histological changes. This is indicated by the establishment of thyroid intoxication. The hysteria followed by this intoxication explains all the symptoms, although in some cases the intoxication fails to appear. The treatment should not be surgical in nature, unless a determining cause, such as a fibroma uteri, salpingitis, or other similar pathological lesions, be present.

TROPHIC TROUBLES IN EXOPHTHALMIC GOITRE.

COURMONT (*Lyon méd.*, 17th September 1899) showed a patient to the members of the Lyons Société des Sciences Médicales, who exhibited all the classical features of Graves's disease, which, however, had become less accentuated since both cervical sympathetic trunks had been stretched by Jaboulay two months previously; but, in addition, she showed two symmetrical patches of thickened skin on the legs, rather like elephantiasis, not painful, and covered with hair. No œdema was found, nor any motor or sensory lesions. The patches were not elephantiasis, scleroderma, nor goitrous pachyderma. What were they?

Soulier regarded them as superficial areas of lymphangitis, having seen an analogous case previously. Lannois had had occasion to see the patient beforehand, and regarded her as a hypnotisable hysteric, in whom the influence of hysteria had originated the trophic lesions.

MUSCULAR LESIONS.

ASKANAZY (*Deutsches Arch. f. klin. Med.*, Leipzig, Bd. lxi. Heft 1 and 2, quoted *Deutsche Med.-Ztg.*, Berlin, 18th September 1899), from an examination of four cases of Graves's disease post mortem, concludes that in its course a severe and wide-spread alteration occurs in the voluntary striped muscles of the body. These are the site of fatty atrophic changes, with the exception of the heart, whose muscle fibres show signs of brown atrophy. In one of his cases the diaphragm was more markedly affected than the other muscles.

These muscular lesions can account for the clinical symptoms shown in loss of flesh and of strength, the paraparesis of the legs (Charcot), and the characteristic tremor; as also the exophthalmos, partly at least, Moebius' convergence sign, and the later "bulbar symptoms." The thyroid gland itself in all cases shows an epithelial proliferation, accompanied by a smaller amount of colloid material than normal, or by its entire absence. He agrees with Greenfield that change of structure in the gland tissue, not increase in size, is the important factor.

RESULTS OF SECTION OF THE SYMPATHETIC NERVE.

COMBEMALE and Gaudier (*Gaz. hebd. de méd.*, Paris, 1898, No. 33) record the result of section of the cervical sympathetic in the case of a woman æt. 32, who had suddenly developed from some unknown cause all the symptoms of Graves's disease, whose symptoms were aggravated by thyroid treatment, and in whom cardiac therapy proved ineffectual. It was followed by lessened exophthalmos, diminution of heart beat, and of the annoying subjective results therefrom, but had no detectable effect upon the size of the thyroid gland itself.

Neusser (*Wien. klin. Wchnschr.*, 1899, Bd. xii. S. 15) has observed an association of exophthalmic goitre and pernicious anæmia; Deléarde (*Gaz. hebd. de méd.*, Paris, Jan. 15, 1899), with locomotor ataxia.

EXOPHTHALMIC GOITRE SIMULATED BY IODISM.

JAUNIN (*Rev. méd. de la Suisse Rom.*, Genève, 20th May 1899) records several instances where treatment of simple goitrous enlargement of the thyroid gland developed into the clinical picture of Graves's disease after active iodine treatment. Inunction of iodine ointments, iodoform by injection hypodermically, iodides, iodide of lead ointment, in the several cases, were the preparations used which were to blame. He suggests that the patients were examples of latent Graves's disease, showing only, however, the simple thyroid tumour, and that the iodine had started the tendency towards its active appearance. Discontinuance of the drugs used, with or without the administration of phosphate of sodium, caused rapid retrocession of the symptoms.

SURGERY.

UNDER THE CHARGE OF

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CYSTINURIA.

DR. HENRI MOREIGNE terminates an exhaustive article on this subject by the following conclusions. Cystinuria is a rare constitutional condition, which owes its name to the presence of cystine in the urine. Its pathological importance depends upon the mechanical disturbances to which it may give rise, namely, renal colic from the passage of cystine gravel, and stone in the bladder. The urine is usually acid, pale yellowish green, and deposits cystine in the form of hexagonal plates. There is frequently also a deposit of tyrosine; the leucine remains in solution in the urine. Uric acid is usually present in excess of the normal.

In cases of cystinuria, the general metabolism of the body is retarded; there is a pronounced and constant diminution in the excretion of nitrogen, and of completely oxidised sulphur, and of phosphoric acid. The extractives are increased; cadaverine and putrescine are regularly present, also leucine and tyrosine. Moreigne does not believe that the cystine is the result of a fermentative process in the intestine; cystine is never found in the fæces; the indican in the urine is not increased; the amount of cystine in the urine is not diminished by intestinal antiseptics. He regards cystine as an intermediate product, incompletely oxidised, met with in certain states of the constitution. It may be formed anywhere in the body, but it is chiefly produced in the liver. The only rational therapeutic measure is to combat the retarded condition of the general metabolism, by increasing the processes of oxidation by every possible means.—*Ann. d. mal. d. org. génito-urin.*, Paris, Sept. 1899.

VILLOUS GROWTHS (PAPILLOMATA) OF THE URETER.

MM. LE DENTU and ALBARRAN of Paris record a case of papillomata, in which they excised the kidney and the entire ureter. The patient, a man æt. 33, began to suffer four or five years before, from attacks of pain in the right loin. The attacks recurred at shorter intervals, and presented all the features of renal colic; they occurred without any cause; during the attack no urine was passed. There was never any gravel or blood. The kidney could be felt in the right loin, and was scarcely at all sensitive. The diagnosis was made of renal calculus, and Le Dentu performed nephrotomy. A moderate degree of hydronephrosis was found, but no calculus. The patient made a good recovery; a small urinary fistula in the loin persisted. Albarran then inspected the ureteral openings with the cystoscope. The orifice of the left ureter was normal; the situation of that on the right side could only be suspected, as no urine escaped from it; a minute villous growth appeared to project from it; a catheter could only be introduced into the right ureter for a distance of 3 or 4 mm. The diagnosis was therefore made of a villous growth blocking the right ureter, and causing the hydronephrosis. The kidney was again exposed by a long abdomino-lumbar incision, and brought out at the wound. An induration was felt in the upper end of the ureter, and was incised; there escaped some old blood-clot and a small calculus; the mucous membrane of the ureter presented a number of papillary fringes, over an extent of 2 cms. A catheter, passed down the ureter, met with an obstruction at its lower end; it was therefore decided to remove the entire ureter along with the kidney; the vesical end of the ureter was ligatured and divided. The patient made an uneventful recovery.

The specimen was found to be a hydronephrosis, caused by a double papilloma of the ureter. That at the upper end has already been described. At its lower end the ureter presented a fusiform dilatation as large as the index finger, and containing old blood-clot, a minute calculus, and papillomatous fringes of the mucous membrane. The intervening portions of the ureter were normal. Microscopical examination confirmed the diagnosis of innocent papillomata.—*Ann. d. mal. d. org. génito-urin.*, Paris, Sept. 1899.

SLOUGHING ULCERS CAUSED BY THE RÖNGTEN RAYS.

MISS DAISY ORLEMAN, M.D., relates the particulars of her own case. She had just recovered from an oblique fracture of the left femur, when the X-rays were applied at the request of one of the attending surgeons. Three exposures were made, at intervals of six weeks and eight weeks respectively. The Edison apparatus was employed. Spark length 8 in., voltage 110; egg-shaped tube, about 6 in. from terminal to terminal; distance of tube from limb, 10 in.; duration of each exposure, seven minutes.

Nothing was observed till twenty-one days after the last exposure, when the first appearance of inflammation occurred, covering an area of about an inch, attended with itching. Day after day the itching continued, and the red area increased in size. Several large blisters appeared, and were opened; a painful raw surface was exposed. Several weeks later there was severe pain, and the raw surface became covered with a false membrane, which gradually increased in thickness, and the central area became an open ulcer. The peculiar excruciating pain increased, and rendered sleep impossible. No applications were of any service. Poultices increased the pain. Five months after the application of the rays, the sloughing area was excised, and the gap closed by sutures. The sloughing and intolerable pain recurred; the ulcer became excavated, the edges of the wound were purple, and the cyanosis extended out a considerable distance, around which were numerous blebs. An area of anæsthesia surrounded the ulcer, and extended almost to the knee. The slough separated slowly; granulation tissue began to form; skin grafts were applied, and, in spite of the unhealthy condition of the tissues, they took very well. Healing was completed nine months after the application of the rays.—*Med. Rec.*, N. Y., 1st July 1899.

Extirpation of the Lymphatic Glands in the Groin and Iliac Fossa.

Lennander of Upsala has planned and carried out the following operation for the removal of these glands, when they are infected with cancer, sarcoma, or tuberculosis. The incision is made from the symphysis pubis along Poupart's ligament to the anterior-superior spine, and then along the anterior third or half of the iliac crest. A second incision is made at right angles, along the line of the femoral vessels. The glands in the groin are then cleaned out in the ordinary way, remembering those between the superficial and deep femoral arteries. Poupart's ligament is detached from the pubes, and from the fasciæ lata and iliaca. The deep epigastric and deep circumflex arteries are each divided between two ligatures. The glands which are found around the origin of these vessels are removed. The abdominal muscles are divided close to their attachment to the iliac crest. The peritoneum is separated from the iliac fossa and adjacent part of the pelvis, along with the vas deferens (or round ligament), the spermatic vessels, and the ureter. The glands can now be removed in a continuous chain or mass from the femoral ring, along the external iliac to the bifurcation of the common iliac artery, and around the obturator and internal iliac arteries. If the glands are infected as high as the bifurcation of the common iliac artery, the skin and muscles along the iliac crest are further divided, and the glands removed along the iliac vessels. Drainage tubes are then placed in dependent positions. Poupart's ligament is most carefully sutured, as are also the muscles attached to the iliac crest. The same operation may be carried out in two stages, with an interval of a week between the two.—*Centralbl. f. Chir.*, Leipzig, 16th Sept. 1899.

THE PROGNOSIS AND TREATMENT OF EXTERNAL ANTHRAX.

SINCE the year 1885, thirteen cases of anthrax have been under observation in Sick's surgical clinique in Hamburg. Of these, five died, in all of which the primary lesion was on the lateral aspect of the neck. Post mortem examination showed general infection with anthrax bacilli. In the remaining cases, the initial lesion was situated on the forearm, cheek, forehead, occiput, and neck. Practically, all the patients were workmen who had to handle American hides, the forearms being bare, and the hides being carried chiefly on the shoulders and back. The serious character of the lesion when it is situated in the neck, is ascribed to the loose arrangement of the subcutaneous cellular tissue allowing an extension of the infection to the mediastinum and mucous membrane of the pharynx and larynx. Radical surgical treatment was employed in three of the fatal cases, not only without benefit, but apparently aggravating the progress of the disease. The author is inclined to agree with Müller, and to leave the anthrax pustule to nature, merely protecting it from secondary infection by suitable dressings.—*Centralbl. f. Chir.*, Leipzig, 9th Sept. 1899.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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AN UNUSUAL CASE.

M. R. ADAMS (*North Car. Med. Journ.*, Wilmington, May 1899) reports the following case. The patient, æt. 47, the mother of five children, ceased menstruating early in the winter of 1891–92. She had progressive enlargement of the abdomen, accompanied by the signs and symptoms of pregnancy. On August 17, 1892, labour pains commenced, and a midwife was summoned. After twelve hours, no progress being made, a doctor was called. On examination, there was no dilatation of the cervix, and the doctor left. On 7th October he was again called, and again found the patient in labour, but the os still undilated. Labour pains ceased; and as the woman was apparently in perfect health, it was decided to await developments. The patient resumed her domestic duties, and every month or six weeks had discharge from the womb which she regarded as menstruation. In Nov. 1898 she developed nausea, vomiting, and diarrhœa, with rapid pulse and a septic temperature. Laparotomy was performed in Jan. 24, 1899, and the uterus opened. It contained about a quart of green, gangrenous fluid, and the disarticulated bones of a full-time child. The patient stood the operation well, but died thirty hours later.

THE USE OF STYPTICIN.

NASSAUER (*Centralbl. f. Gynaek.*, Leipzig, 1899, No. 18) reports some observations with stypticin, from Gottschalk's clinic. Until recently all cases of uterine hæmorrhage were treated with this drug to ascertain its effect, with the result that the indications for its use are more clearly defined. Its action is antagonistic to ergotin, not producing muscular contraction, but acting principally on the vasomotor nerves. It is beneficial only if the mucous membrane is intact, but in hæmorrhage due to congestion or tumours of the appendages its action is almost specific. In endometritis fungosa it should only be administered after curettage. It is also useful in cases of excessive bleeding due to chlorosis, phthisis, and the climacteric. In cases of dysmenorrhœa both pain and hæmorrhage are diminished.

RECTAL IRRIGATION IN GYNÆCOLOGY.

DR. HYDE (*Am. Gynæc. and Obst. Journ.*, N. Y., Aug. 1899), as a result of considerable experience, advocates rectal instead of vaginal irrigation in selected cases of pelvic disease. He prescribes this mode of treatment on every possible occasion, especially in cases of retroversion, pelvic exudation, tubal and ovarian lesions in all stages, and also in constipation. To demonstrate the particular action of rectal irrigation, the author says: "When we recall how clearly defined the uterus and its appendages appear during bimanual rectal examination, and how intimately the genital and rectal circulations anastomose, a clearer conception is gained of the more constringing effect of a prolonged rectal, over vaginal irrigation. By the ballooning of the entire rectum with the hot fluid, a larger vascular area is directly presented to the heated medium, and its ultimate effect on the vessels is greatly increased. In vaginal douching, the fluid, being limited by the vaginal vault, only comes in contact with the vaginal walls and the portio." He contends that the pelvic viscera and their abundant vascular supply are more fully bathed by the rectal than by the vaginal route, and that the unstriped muscle of the intestine is stimulated through the sympathetic system, increasing peristalsis, and also reflexly acting on the cardiac muscle, as indicated by the quality and tension of the pulse before and after irrigation. As regards technique, the tubes employed are made of rubber, aluminium, or glass, the latter being preferable. A large-sized tube is inserted, the patient being in the dorsal or Sims' position. From two to eight gallons at 110° to 115° F. are used. The tube is gently moved backwards and forwards, and rotated in order to dislodge any particle of fæcal matter which may obstruct its lumen, and also to prevent any portion of the rectal mucosa being drawn into the fenestra by the suction caused by the reflex. The author goes on to describe certain cases in which this mode of treatment is particularly beneficial, and sums up as follows:—

(1) Leucorrhœas. (2) As a substitute for vaginal douching in young girls. (3) Acute and chronic ovarian and tubal lesions, with the possible exception of pyosalpinx. (4) Intestinal paralysis, following sepsis. (5) After major pelvic operations, to relieve any abdominal discomfort or tympanites. (6) Intestinal colic. (7) Doubtful in constipation.

AN EXPERIMENT IN TRANSPLANTATION OF THE ENTIRE HUMAN OVARY.

James H. Glass (*Med. News*, Phila., April 29, 1899) reports the following cases:—1. A., housemaid, æt. 39, who had undergone double oöphorectomy two years previously, followed by the menopause, cessation of sexual instinct, anæmia, impaired nutrition, and inability for exertion. On examination, the uterus was small, flexed, and fixed posteriorly, and ventro-fixation was performed. 2. A married woman, æt. 17, had a marked cicatrisation of the vagina, the result of sloughing after labour. After operation, the canal was inadequate for child-bearing, and the excision of one tube and ovary was consented to, with the hope of preventing pregnancy. The ovary was rapidly removed, placed in gauze, and kept moist with warm saline solution. In Case 1, the vagina and connective tissue were incised down to the cervix, which was stripped up to the peritoneum, and the latter raised from its attachments to a point approximating the normal position of the ovary. The ovary from Case 2 was then introduced, and the canal closed with catgut sutures. Six days later the patient had a condition of sexual erethism, lasting two days, during which she had two erotic dreams, since when sexual impulse has continued. Sixteen days after operation, menstruation occurred, lasting two days. In December 1898 she again menstruated, the flow lasting three days, of normal colour, and accompanied by a little pain. She again menstruated in February. In other ways she is physically and mentally well. As the ovary plays such an important part in metabolism, the author makes a consistent effort to save at least one part of an ovary in all his operations, which, according to Martin, prevents the nervous and nutritive symptoms which supervene when both ovaries are entirely removed, but holds that in some cases, where both ovaries must be sacrificed, this operation of transplantation of an ovary may be justifiable.

THERAPEUTICS.

UNDER THE CHARGE OF

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FILIX MAS AS AN ANTHELMINTIC.

Grawitz (*München. med. Wchnschr.*, 19th September 1899) draws attention to the poisonous symptoms liable to be produced by the liquid extract of male-fern, and which are due, as its anthelmintic action is also, to its active principle, filicic acid. Nausea, faintness, and tremors are not uncommon, and these sometimes develop into convulsions, delirium, coma, and death. Optic atrophy has been known to follow in severe cases of poisoning, while transient amaurosis and amblyopia are comparatively frequent. Sometimes the red blood corpuscles become destroyed, and the hæmoglobin dissolves in the blood, giving rise to jaundice. Gastro-intestinal catarrh and renal irritation also occur.

To avoid these effects, the dose should be kept about 2 drms. at most, and no castor-oil or other oil should be given about the same time, owing to filicic acid being soluble in it. Severe anæmia, kidney disease, or other conditions of ill-health, induce a liability to poisonous effects, and hence more care than usual should be exercised in these cases.

Grawitz holds that the usual preparation of emptying the bowel and withholding food, tends to favour absorption of the drug, and consequent poisoning. He therefore administers the anthelmintic without any preliminary treatment except perhaps a mild saline, which is followed by coffee. In treating over a hundred cases, this method has been invariably successful.

TREATMENT OF CORPULENCE.

v. **HOESSLIN** commences an article on this subject with the statement that, having during six years treated corpulence on Oertel's principle, by limiting the amount of fluids taken, he has abandoned this method, because—(1) The patients suffered greatly from thirst and hunger, and were disturbed in their general health; (2) many of the patients so treated became severely neurasthenic and sleepless; (3) the loss of fat was, in most cases, considerable for some weeks, but after that it seldom bore any relationship to the trouble and suffering caused by the dietary.

During some years he has adopted the following principles in treating these cases:—(1) A purely proteid and fatty dietary; (2) stimulation of the metabolism by hydrotherapy; (3) administration of thyroid gland; (4) increase of tissue oxidation by means of exercise. This diet suffices; no feelings of hunger or thirst are experienced while living on it, and it can be continued for months without injury to the general health.

For breakfast, tea or coffee, with cream but without sugar; brown bread and plenty of butter are allowed. Fish, fowl, flesh, cheese, butter, cream, and other fats, with those fruits and vegetables which are as free as possible from sugar and starch, make up the dietary. Water, mineral waters, and thin wines are the drinks allowed. No restriction is placed on the amount eaten or drunk.

The hydropathic treatment consists in cold baths of different kinds, which promote oxidation of the body fat, and in baths which induce free perspiration.

Thyroid preparations must be used with great caution, as they promote wasting of muscle as well as of fat. A small dose is given, and its effect on the pulse watched, as patients react strongly in some cases, and scarcely at all in others. Its use greatly hastens the loss of weight, but it should not be continued if it produces any other effects.

Exercise consists in tennis, riding, bicycling, sawing and cutting wood, hill-climbing, rowing, etc.

A combination of all four methods gives much more satisfactory results than any one of them alone. A day's programme during the cure is somewhat as follows:—

6.30 A.M.—Cold sponge; walking or other exercise for half an hour to three-quarters of an hour. 7.30 A.M.—Breakfast—tea or coffee with cream; one slice brown bread thickly spread with butter. 8.15.—Vapour bath every second day, alternated with cold bath. 9.30.—One egg or a slice of fat bacon. 10–12.30.—Exercise. 12.30.—Lunch—bouillon and egg; fat meat with salad, an apple, some brown bread, mineral water, and one thyroid tablet. 1.30 P.M.—Rest, and then a cup of tea or coffee. 3.15–6.15.—Exercise. 6.30.—Cold douche. 7.—Dinner of proteid food and green vegetables chiefly; one thyroid tablet. Billiards or skittles may fill up the evening.

ACTION OF HYOSCIN.

THIS alkaloid, which also goes by the name of Scopolamin, has been studied lately in some detail by Windscheid (*Deutsches Arch. f. klin. Med.*, Leipzig, Bd. lxiv.). His experiments show that in frogs it first quickens and then slows respiration, while larger doses cause a condition of narcosis and paralysis. In rabbits a dose of 3 grs. only caused dilatation of pupils and quickening of the respiration; in cats and dogs the chief action is on motility; there ensue paresis of the extremities and ataxia; respiration is little affected, but there is marked mydriasis. The action on the circulation was slight, and none of the animals died, even after the large doses used. It antagonises the action of muscarin on the heart, and is excreted in the urine.

In man it has to be used with great caution and in very small dose. Windscheid states that after $\frac{1}{650}$ gr. distinct symptoms occur, such as dryness of mouth, faintness, and somnolence, but in the insane much larger doses can be borne with perfect impunity. In this dose the author has used hyoscin successfully to lessen tremor, as in paralysis agitans, a subcutaneous injection being given three to five times weekly. It has been found of much value in hyperhydrosis, and especially in the night sweats of phthisis, where he usually gives it as a pill containing $\frac{1}{325}$ to $\frac{1}{150}$ gr. The toxic dose lies between $\frac{1}{100}$ and $\frac{1}{30}$ gr. No death has yet occurred from its use, but serious symptoms, such as coma, cyanosis, paresis, and twitchings have been observed.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

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THE SPECIFIC CAUSE OF YELLOW FEVER.

REED and Carrol (*Med. News*, N. Y., 9th September 1899) have made a powerful reply to Sanarelli's paper, entitled "Some Observations and Controversial Remarks on the Specific Cause of Yellow Fever," which appeared in the *Medical News* under date of 12th August 1899. It will be remembered that Messrs. Reed and Carrol had published a preliminary note upon the *Bacillus icteroides* being really a variety of the hog cholera bacillus. It is to be regretted that Sanarelli permitted himself to use a warmth in his reply which scientific men usually fight shy of. The true scientific mind should be free from mental prejudice, and if we are to take umbrage when our results are assailed, we are not likely to have time for anything else in this world, or to advance much in the true establishment and extension of knowledge. Sanarelli's criticisms are answered *seriatim.* They are as follows:—(1) The marked difference in growth on potato of his bacillus and *B. choleræ* series. (2) That the toxins of his bacillus resist a temperature of 100° C., while that of the hog cholera bacillus undergoes modification as low as 60° C., and is entirely destroyed at 100° C. (Sanarelli here quotes from Selander's observations.) (3) Dissimilarity of growth in gelatin plates of these two bacilli. (4) That while the hog cholera bacillus produces a large number of foci of coagulation necrosis, those do not occur in animals inoculated with *B. icteroides.* (5) The failure to produce acute fatty degeneration in the liver in dogs injected with his bacillus. In answer to his first objection, they state that while the *B. icteroides* may grow as a colourless, moist, scarcely visible layer on potato, it does not always do so (as he asserts), becoming sometimes faintly yellowish or decidedly brownish; further, that the hog cholera bacillus is not always brown, but shows much the same variations. In answer to the second objection they quote from the work of Welch and Clement, to the effect that this statement is not trustworthy. In relation to the third objection, that colonies of the two forms of bacilli on gelatin plates are as readily differentiable, even at first sight, as it is possible for bacilli to be, they state positively that they have been unable to detect any differences in the colonies of these two bacilli with the naked eye, and that it is only by means of the microscope that faint differences can, as a rule, be made out, such as slightly increased radiation in the colonies of *B. icteroides* as compared with those of *B. choleræ* series. In answer to the fourth objection, they first state that Sanarelli is wrong in saying that areas of local necrosis in the liver are specific of hog cholera and limited to that affection, and is completely unknown in infections with *B. icteroides.* They quote authorities who have found such areas of focal necrosis under the action of various organisms, *e.g., B. coli communis, B. typhosus,* bacillus of diphtheria, etc. There is no doubt that pathologists are familiar with such focal necrosis in many other diseases than hog cholera. They further found similar areas resulting from the *B. icteroides*, and quote how other authorities have done the same. In answer to the last objection, as to the production of acute fatty degeneration in the liver of dogs, they show by comparison tables, that while the proportion of cases of this degeneration recorded by them was less than that reported by him, it was yet greater than that reported by De Lacerdon and Ramos, whom he quotes as supporting his statement. They further proceed to refute other more specific statements of his, regarding their methods of experimentation and the purity of their cultures. We may be assured that the matter will be investigated by other workers. Results, however good they may appear to be, must be corroborated freely before they can be generally accepted, and we are, so far, without this corroboration of Sanarelli's discoveries in relation to yellow fever.

MALARIA OF THE CENTRAL NERVOUS SYSTEM.

It is well known that the malarial parasite has a special liking for the internal blood vessels; that the peripheral circulation may be comparatively free from them, while the deeper and more central circulation is crowded with them. Especially is this true of the capillaries of the brain in severe cases. Marinesco (*Compt. rend. Soc. de biol.*, Paris, 24th March 1899) reports a case of the latter nature, in which the parasites were so enormously plentiful in the brain and spinal cord, that the grey matter of these organs appeared to the naked eye to be of an almost violet hue, and even the white matter to be of a mottled greyish blue. The microscopic examination showed that the discoloration was due to immense numbers of the minute form of the malarial parasite laden with pigment. They practically filled the arterioles and capillaries of the brain and cord.

DIPHTHERIA.

Action of diphtheria poison on the heart.—Rolly has given (*Arch. f. exper. Path. u. Pharmakol.*, Leipzig, 1899, Bd. xlii.) the results of a series of experiments on animals with the diphtheria toxin as follows:—(1) The fall in blood pressure induced by the poison of diphtheria is due to paralysis of the vasomotor centre, and also to the paralysis of the heart, which, in spite of artificial respiration, soon ceases to beat. (2) This action on the heart is direct, and in warm-blooded animals is independent of the nervous system. (3) The paralysis of the heart develops after a more or less definite latent period. Direct injection of the diphtheria poison, or transfusion of lethal diphtherial blood, interferes with the action of the isolated normal rabbit's heart only after a certain latent period. (4) On the other hand, the action of the poison takes place at the same time, even if, before the appearance of the poisonous symptoms, or at the beginning of such toxic action, the heart is washed out with normal blood. (5) This property possessed by the diphtheria poison, of action on the heart, leads to the opinion that the poison gradually takes hold of the heart muscles, and is seemingly stored up there until its complete action is manifest; this further explains the continuance of functional heart disturbances after many of the acute affections.

THE RELATION OF DEXTROSE TO THE PRODUCTION OF TOXIN IN BOUILLON CULTURES OF THE DIPHTHERIA BACILLUS.

In an interesting paper on this subject, Theobald Smith (*Journ. Exper. Med.*, N. Y., May–July 1899, p. 373) investigated the observations of others on this subject, and comes to the conclusion, contrary to all the views hitherto expressed, that dextrose is not in itself inimical to toxin production, that a certain quantity is, in fact, essential to an abundant accumulation of toxin. He employed an abundant series of tests, and his results are tabulated as follows:—(1) Dextrose is not in itself injurious, but rather favourable to toxin formation. When added in quantities not exceeding 0·2 per cent. to peptone bouillon freed from fermentable acid-producing substances (muscle sugar), it leads to a maximum accumulation of toxin by utilising the available peptone to the best advantage. (2) The different courses taken by cultures of diphtheria bacilli in ordinary unfermented peptone bouillon containing muscle sugar, and in peptone bouillon made from fermented infusion, to which 0·1 to 0·2 per cent. dextrose has been added, are manifested by an increased production of toxin in the latter, as well as by a rapid return from an acid to an alkaline reaction. In the former an acid reaction may prevail even under most favourable conditions. (3) These differences may be explained by assuming, either that the acid products of the muscle sugar are different from those of dextrose, and non-utilisable, or else that the bouillon contains certain other unknown inhibitory substances removed during fermentation. The use of synthesised media, and an analysis of the acid products in fermented bouillon plus dextrose, and in unfermented bouillon, would aid in explaining the differences. (4) Among the accessory conditions which favour the toxin production in unfermented bouillon, as pointed out by Park and Williams, are increased quantities of peptone, well-developed surface growth of the diphtheria bacilli, and a low initial acid reaction (phenolphthalein). In fermented bouillon these accessory conditions are also favouring, though of less importance.

ON THE DIPLOCOCCOID FORM OF THE COLON BACILLUS.

ADAMI, Abbott, and Nicholson (*Journ. Exper. Med.*, N. Y., May–July 1899, p. 349) have produced a joint paper on this subject which is interesting from several points of view, especially as it bears upon the minute bacillus described by Adami as occurring in cirrhosed livers. They divide their paper into two parts—(1) On the production outside the body of a diplococcoid form of the colon bacillus; (2) the same inside the tissues. Their views in the first division may be summarised as follows:—(1) The short form of the normal colon bacillus, cultivated upon ordinary media, frequently presents polar staining. (2) In the more filamentous forms a succession of these more deeply staining bodies is at times to be recognised. (3) Growth under relatively unfavourable conditions renders the polar staining more prominent, so that the stouter forms may closely resemble diplococci, and the longer forms a succession of minute dots in pairs, and of somewhat larger, more ovoid dots, in a lightly stained sheath. (4) They never found, when grown on ordinary media, the diplococcoid form existent alone, always along with the larger variety, although it was sometimes the predominant form. (5) When grown in ascitic and peritoneal fluids, they obtain diplococcoid growths, which they were unable to cause to revert to type. (6) It has been by the prolonged action of these fluids that these changes in the colon bacilli have been produced; cultures made from them immediately after removal from the body yielded typical cultures of the colon bacillus, and when these fluids were kept from ten to twenty days the modified diplococcoid form was produced. (7) The bile has a slight but inhibitory action upon the growth of the colon bacillus. (8) The ascitic fluid from a case of hepatic cirrhosis was found to possess similar properties of modifying the colon bacillus and inhibiting its growth. (9) These modified colon bacilli are relatively minute, assume a diplococcoid form, are non-motile, form pin-point colonies upon agar, cause but slight turbidity in broth, and an almost invisible growth upon potato, act but slowly upon litmus milk, have lost the power of fermenting glucose, lactose, and dextrose broths, and do not develop the indol reaction. The second part of their paper, which deals with the diplococcoid form of the colon bacillus in the tissues of rabbits, may be summarised as follows:—(1) The colon bacillus injected into the circulation is rapidly taken up by the liver and kidney. (2) Some of the bacilli are ingested by the endothelial cells in the liver within fifteen minutes after inoculation. The process may go on until some of them are full of bacilli. (3) In this process of ingestion the bacilli are broken up into shorter lengths which may show us two deeply stained dots, and hence resemble diplococci. (4) The modified bacilli may be discharged from the endothelial cells within two hours after inoculation, and taken up by the liver cells. (5) In the liver cells the modified bacilli are to be recognised as small diplococci, sometimes very small, as if they were undergoing destruction. (6) In the kidney the same process is at work, suggesting a gradual digestion of the bacillus in both organs. They draw certain conclusions regarding the structure of the colon bacillus. It is a stumpy bacterium with rounded ends. It consists of at least two parts, one which takes the stain deeply, the other slightly. Under ordinary conditions of growth, these are not to be distinguished from one another: under unfavourable conditions, the chromatin or staining portion seems to collect at the poles, giving the appearance of a diplococcus surrounded by a capsule. The long variety would appear to be easily broken up into the component stumpy forms in the liver cells.

THE ADVANCE OF BACTERIOLOGICAL SCIENCE IN THE DIAGNOSIS AND PREVENTION OF DISEASE.

LEITH, in an address on this subject (*Birmingham Med. Rev.*, October 1899), refers to the nature of the toxins produced by the streptococcus, and mentions an observation of Marmorek's of unusual interest. He recently informed him that he believed he had hit upon a reason why the streptococcus, as ordinarily cultivated, produces so little toxin. The amount of toxin produced by any given culture is usually so small in comparison with the number of germs present, as to suggest the presence of some inhibitory substance of early appearance and extracellular position. He found that, while the germ-free filtrate of such a culture possesses very little toxin, it will yet prevent the growth of fresh streptococci, for if these be added to the filtrate they do not grow, whereas other organisms, *e.g.* typhoid, plague, cholera, etc., flourish readily. This substance is produced by the streptococci, and its presence stops their specific action—in other words, their toxin formation. They have not lost this power. It is only in abeyance, and the removal of the substance would soon result in more toxin formation; but it would appear to be of coincident or nearly coincident formation with the toxin, since the production of the latter again quickly comes to an end. By its successive removal it becomes possible to obtain the full amount of toxin production, and it is very considerable, from any given culture. He has not yet succeeded in isolating this substance, and he knows nothing as to its nature, beyond the fact that it is inimical to the growth and development, and hence to the disease-producing power, of its own organism. If further experience should show that not only the streptococci but many other germs have this action, which may be termed for the present a dual one, and always or sometimes produce extracellular substances inhibitory of their own powers of multiplication and toxin formation, it will open up new views on the subject and still further complicate its problems. Later, in regard to inoculation against typhoid, he mentions a personal observation of Pfeiffer, to the effect that he had succeeded in obtaining the highest possible obtainable degree of immunity against typhoid by using only one injection. He found very large dogs to be the most suitable animals. Their serum can protect other animals for a time from lethal doses of the toxins subsequently or even simultaneously introduced. Its effect has not yet been tried upon man. It will be remembered that, along with Kolte, he produced in man a high degree of protection against cholera by means of only one injection of the vaccine, and we may reasonably expect a certain measure of success, at least for this more recent discovery.

INSANITY.

UNDER THE CHARGE OF

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INTERESTING HYSTERICAL PHENOMENA.

ONE of those unusual phenomena which intensifies our interest in the inexplicable psychological manifestations of hysteria is recorded by F. R. Fry (*Journ. Nerv. and Ment. Dis.*, N. Y., Aug. 1899). The patient, a girl æt. 14, had previously suffered from ulcer of the stomach, followed by great weakness and delirium, alternating with hallucinatory states free from excitement. She displayed frequently hemiopic hallucinations and monocular diplopia. Soon after coming under Dr. Fry's care, there appeared complete anæsthesia and paralysis of the whole right side. She was anæsthetic to touch and to temperature and pain tests made in the usual way. The experiments of Binet suggested themselves to the writer as likely to succeed in this case. The patient was directed to look at the wall (a plain white surface), on the left side of her bed, and to state what kind of objects she saw there. He then traced on the anæsthetic right arm and forearm various simple geometric figures—

triangles, squares, circles, etc. She saw them distinctly on the wall, naming them without hesitation from the first. Letters and numerals carefully traced were recognised in the same way. The tracings were lightly made with the finger-nail, or an ordinary lead pencil not much sharpened. When directed to look at a coloured screen during the tracing, she always saw the figures surrounded by the colour complementary to the one before her, *i.e.*, while looking at the blue screen she saw the figures in a red field, and *vice versâ*. Simple objects placed in the anæsthetic hand, and the hand closed upon them, were seen upon the screen, *e.g.*, an open match-box. A silver dollar, similarly held, was recognised as a disc. When a pocket-handkerchief was tied round the wrist, she described "a dark arm and hand with a dark cloth tied about it." The interesting point in the experiments is that, while the patient was unable to distinguish objects tactually in the ordinary way with the anæsthetic hand, she could interpret the same objects by the aid of the visual sense. Great care was taken to prevent any deception on the part of the patient, and only persons who understood the necessity of caution were admitted to the room during the experiments.

THE USE OF HYPNOTISM IN ALCOHOLISM AND SEXUAL PERVERSION.

IN those perversions of instinct which are not readily amenable to ordinary methods of medical treatment, any authoritative pronouncement on the value of hypnotism as a reliable therapeutic agent is widely welcomed. It is therefore gratifying to be able to record the views of Bechterew (*Centralbl. f. Nervenh. u. Psychiat.*, Coblenz u. Leipzig, 1899, N. F., Bd. xxii.). According to this authority, hypnotism is an excellent remedy in the treatment of habitual drinkers, or alcoholism. After suggestion, there is almost always a sudden cessation in the habit, or, at any rate, drinking ceases after a few days of moderate indulgence. In order to maintain the improvement, it is necessary from time to time to renew the suggestion, but the frequency and the continuance of further suggestions depends upon the gravity of each particular case, the depth of induced hypnosis, and the degree of suggestibility. As a rule, two séances are sufficient for the first week; afterwards they are held at longer intervals; and finally they are repeated at intervals of some months. Occasionally, after a single sitting, temperance is established for many months, but it is always safer to repeat the suggestion at intervals of some weeks or of two or three months. In periodic drunkenness (dipsomania) hypnotism may effect a useful and durable effect, if the suggestions are repeated so as to anticipate the craving attacks. The frequency of relapse depends upon the degree of degeneracy present, and upon such factors as surroundings, education, and the tolerance or intolerance of the system for the alcoholic poison. Hypnotism may be practised during the height of an attack of delirium tremens, so long as the mental state is capable of suggestion; even the presence of hallucinations in no way precludes its use. The mental and physical symptoms of an attack may be ameliorated under its use, and the patients are often induced to sleep profoundly. Bechterew recommends that during the treatment of alcoholism by hypnotic suggestion other medicinal agents usually employed for strengthening and invigorating the system should not be discontinued. Among these he specially mentions baths, massage, bromides with codeine, digitalis, or adonis vernalis, and tonics, such as strychnine.

In illustration of the use of hypnotism in sexual perversion, he instances two cases of homosexuality. The one obtained temporary relief after three séances and the use of the mixed bromides with codeine. Under this treatment the abnormal sensations and the neurasthenic depression under which he laboured almost completely disappeared. The other benefited markedly from hypnotic suggestion alone. Bechterew recommends in such cases the frequent treatment by suggestion, the continuation of which should depend upon the gravity and the individuality of each case, as well as upon the degree of suggestibility of the patient. In order to be successful, it is necessary to produce a sufficiently profound degree of hypnosis, and for that purpose the patient should receive the suggestion both when awake and when half asleep. The subject should be warned that it is only necessary to close his eyes, to think of his health, and to fix his attention firmly upon the suggestions made to him. In this way he is encouraged to hope to have no fear of the ordeal, and to expect a change for the better. Suggestions made in this way at the commencement of the treatment are by no means without effect. During the course of hypnotic suggestion, treatment by such ordinary medicaments as the physical condition of the patient indicates, should not be neglected.

THE PUPILLARY REFLEX CENTRES.

IN the *Deutsche med. Wchnschr.*, Leipzig, 1899, Nos. 25 u. 26, Liebrecht discusses the anatomical relations and positions of these reflexes. He holds with other authorities that special reflex fibres run in the optic nerve and tract side by side with the sensory fibres, but that ultimately the former separate themselves to enter on each side the anterior ganglia of the corpora quadrigemina. From the latter bodies a system of fibres proceeds to the nucleus of the pupil sphincter in the oculomotor region, in the floor of the third ventricle. The nuclear region of the pupillary sphincter is also the contraction centre of the pupil, for destruction of that centre causes dilatation and absolute rigidity of the pupil. The dilatation centres are two in number, and are connected with one another. The one is situated in the cortex cerebri (its exact position is not indicated), and it is acted upon by mental and sensory perturbations. The second centre is located in the cervical portion of the spinal cord, at a point between the emergence of the sixth cervical and the second pair of dorsal nerves. This centre gives communicating branches to the sympathetic nerve and ganglion. It is in constant activity, and receives stimuli from the peripheral sensory nerves.

Roux (*Arch. de neurol.*, Paris, September 1899) writes on the existence of a double oculomotor cortical innervation centre. His article is long and detailed, so that only a brief summary of the conclusions he arrives at can here be given. 1. Normal anatomy, physiological experiments, clinical observation, and pathology, all help us towards the opinion that there are two oculomotor cortical centres. The anterior centre has its position, probably, at the base of the second frontal convolution, in a zone corresponding to the sensory projection of the fifth nerve. The second (posterior centre) corresponds in situation to the special sensory projection of the optic nerve, on the internal and inferior surface of the occipital lobe. 2. Each of the centres is bilateral, and controls not only the muscles innervated by the oculomotor nerves, but also the orbicularis palpebralis, that is to say, the whole motor apparatus of vision. 3. An isolated lesion of the anterior oculomotor centre may cause—(*a*) Conjugate deviation of the eyes; (*b*) slight affections of the movements of the eyelids. 4. An isolated lesion of the posterior centre may produce conjugate deviation of the eyes and hemianopsia. Lesion of the angular gyrus produces the same effect by implication of the underlying fibres, proceeding from the internal surface of the occipital lobe. 5. Ptosis of cortical origin is perhaps due to a simultaneous lesion of the two oculomotor centres on the same side. 6. A bilateral and symmetrical lesion of the two anterior oculomotor centres or their projection fibres produces a peculiar clinical appearance, characterised by abolition of the voluntary movement of the eyes and eyelids, with conservation of reflex, co-ordinated, adapted, and conscious movements. These latter movements being under the control of the posterior, oculomotor centres remain intact.

Hirschl maintains (*Wien. med. Wchnschr.*, 1899, S. 22) that he has been able to establish from his researches that in general paralysis the loss of the sympathetic pupillary reaction almost always precedes the loss of the light reaction. Microscopic investigation has convinced him that in all cases of the disease in which there occurred affection of the pupil reaction, atrophy of the sympathetic ganglion and nerves was present. He holds that the atrophic change in the sympathetic is much more pronounced than is usually described in such cases. He is not, however, of the opinion that this is due to an extension of the morbid process from neighbouring areas, as, *e.g.*, in tabes, but rather that it is the result of a pre-existing senile degeneration or of a toxin circulating in the blood. With regard to the so-called "paradoxical light" reaction (the dilatation of the pupil in the presence of light), he considers that it is either due to the heat of the lamp used (sympathetic reaction), for he failed to obtain it in his cases when he used cold rays, or that it is a misinterpreted phenomenon, and depends upon insufficiency of the internal oculomotor muscles, which, when light falls upon the eyeballs, permits them to be abducted.

DISEASES OF THE EAR, NOSE, AND THROAT.

UNDER THE CHARGE OF
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A Contribution to the Statistics of the Dangerous Complications of Suppurative Ear Disease.

In the *Arch. Otol.*, N. Y., 1899, Bd. xxviii. Nos. 2 and 3, some very interesting statistics are furnished by Teichmann of Berlin, mainly with regard to certain points which may have a causative relation to the dangerous complications arising in the course of suppurative otitis media. His figures are based upon the official returns made by the hospitals to the Bureau of Statistics of Prussia, and they are made up as follows:—(*a*) 709 cases of operation on the mastoid process during the year 1894; (*b*) 930 cases of operation on the mastoid process during the year 1895; (*c*) 111 deaths from complications of suppurative ear disease during 1893–1895 (without operation).

There was thus a total of 1750 cases, from which the following deductions were made:—62·1 per cent. of the patients were *males*, 37·9 per cent. were *females*. As regards the distribution of the cases to the various *ages*, it was found that more than half of those (56·6 per cent.), in which dangerous complications arose, belonged to the period from six to thirty years; and if the period covering the first six years of life be included in this, we find the total percentage is raised to 71·8 per cent. The onset of dangerous complications after the age of 30 is therefore far from frequent.

These figures have an interesting bearing upon the question of life insurance. While summarising the question of middle ear disease in relation to life insurance, in this Journal in November 1898, the result of a discussion upon this subject at the Edinburgh meeting of the British Medical Association, we referred to the fact that the larger number of deaths occurred before the age of 35. Whether the age of 30 or 35 be accepted as the limit of the most dangerous period of life in reference to ear complications, life assurance is rarely applied for until this "dangerous period" has passed. Teichmann's statistics, therefore, tend to confirm the view held by many, that a suppurative middle ear condition may not have so important a bearing upon life insurance premiums. In computing the *relative frequency with which each ear participated* in the complication, it was found that only 462 cases could be considered. Of these, 229, or 49·6 per cent., arose in the right ear, 207, or 44·8 per cent., arose in the left, while the onset of complications from both ears arose in 26, or 5·6 per cent. As Teichmann observes, the total number of cases is too small to attach much importance to the figures. Another interesting point inquired into was the relative frequency with which dangerous complications arose *in the course of acute and chronic middle ear suppuration.* Out of 665 cases in which the returns stated the character of the suppuration, 24·9 per cent. were acute, and 75·1 per cent. were chronic. There is thus a striking difference in the figures. No conclusions could be drawn as to the mortality in acute and chronic cases without operation. In the May number of this Journal we quoted several cases of acute middle ear suppuration, complicated by secondary infective lesions, and drew attention to a greater frequency of such complications in the acute cases than was perhaps generally supposed.

The *cause of the initial suppuration* underlying the complication was mentioned in 236 cases. Scarlet fever in 29·2 per cent.; influenza in 17·8 per cent.; scrofula and tuberculosis in 16·1 per cent.; diphtheria in 10·6 per cent.; measles in 8 per cent.; and colds, typhoid, syphilis, whooping cough, trauma, etc., were the various causes assigned in the remaining 18·3 per cent. Thus the acute infectious diseases of childhood accounted for 48·7 per cent., or nearly half the number of cases. The author further found that the suppuration in influenza otitis almost always ran an acute course up to the inception of the dangerous complication, but in tuberculosis, diphtheria, and measles the course was chronic before the onset of a secondary lesion.

Considerable attention was paid to the influence of *occupation* upon the occurrence of dangerous complications. A tabulation of the cases, according to the occupation of the patients, showed a marked preponderance of such in the farming and metal industries, amongst tradespeople, officials, builders, wood-workers, domestics, and the textile industries. In order to eliminate the possibility of chance, the figures of the industrial census were examined, and the relation of the above cases and deaths with the total number of persons employed in each occupation was compared. The results then showed the greater participation of the metal, textile, and wood industries, the tradespeople, domestics, and officials. On the other hand, the farming and building industries now fell far below the average, while the sedentary occupations requiring much writing contributed twice as many cases as the average. The figures do not substantiate the view that persons of better social position run less risk of complications—a natural view to hold, and based on the supposition that they can give more careful attention to the ear condition. On the contrary, persons of an independent income showed as large a percentage as the skilled labourers, and twice as large a percentage as the day-labourers and domestics.

Finally, with regard to the results of the operations performed in groups A and B, Teichmann found that of 1639 operations, 154 ended fatally, eight of these, however, from causes not connected with the operation.

SOME FATAL CASES OF ACCESSORY SINUS SUPPURATION.

AT a time when so much interest is taken in the diagnosis and treatment of chronic suppuration in the nasal accessory cavities, and when operation is performed in so many cases, it is advisable to make special note of the occasional fatal cases which are published. At the recent discussion upon frontal sinus empyema, which was held at the Portsmouth meeting of the British Medical Association (*Journ. Laryngol.*, London, September 1899), no fewer than three fatal cases of chronic frontal empyema were reported. Professor Luc of Paris recounted one case in which more than one operation had been found necessary, both upon the maxillary antrum and frontal sinus. At the third operation both frontal sinuses were found diseased; they were freely exposed and curetted, and as many of the ethmoidal cells as were accessible were treated in a similar manner. No drain was used, and the external wound was closed. Extensive suppuration beneath the skin covering the frontal bone subsequently developed, necessitating free incisions down to the bone. Subperiosteal abscesses continued to develop, and a diffuse septic osteitis was followed by the formation of extradural and subdural abscesses, and the death of the patient.

Dr. Herbert Tilley of London reported a case in which both frontal sinuses were diseased, necessitating opening and curetting. The right fronto-nasal duct was enlarged, and a drainage tube passed into the nose, the left sinus being drained through the same tube, the septum between the sinuses having been destroyed. The external wound was closed. Antiseptic irrigation through the nasal tube was carried out thrice daily. Owing to further suppuration in the right sinus, the operation was repeated, but the left sinus on this occasion was drained by a tube passed into the left nostril. Subperiosteal abscesses now began to form over the frontal bone, and, notwithstanding free incisions, the whole scalp became undermined, and extensive necrosis of the cranial vault followed, with the formation of numerous abscesses in the cerebrum and sinus thrombosis.

Dr. Rudloff of Wiesbaden described another fatal case, in which both antra, both sphenoidal sinuses, and both frontal sinuses were diseased. The different sinuses were operated upon as in the order named. A second operation upon the left frontal sinus was found necessary, the right being at the same time opened. The posterior wall of the left sinus was found to be carious, and this was completely removed at the second operation. Symptoms of extra-dural abscess and an extensive purulent lepto-meningitis developed, which proved rapidly fatal.

These cases show the risks which may arise after operative interference upon the frontal sinuses, and the difficulty experienced in treating an acute osteomyelitis. In the August number of this Journal we reported another fatal case, where basal meningitis supervened two days after the operation upon the sinus.

In the *Ann. d. mal. de l'oreille, du larynx, etc.*, Paris, August 1889, MM. Caubet and Druault report an interesting case, in which the sequence of events appears to have been as follows:—Suppuration originated in one maxillary antrum, in consequence of severe dental caries; the ethmoidal cells and sphenoidal sinus next became infected; perforation of the roof of the sphenoidal sinus was followed by meningitis and death.

As the result of recent post-mortem examinations, it is evident that suppuration frequently occurs in one or more of these cavities, and in some instances it is probably overlooked during life, and in others no treatment is sought for by the patient. Kicer of Copenhagen (*Laryn-*

goscope, St. Louis, February 1899) based a number of observations upon an examination of the accessory sinuses in 200 post-mortems. He found empyema of the antrum in thirty-nine cases, in nine of which the affection was bilateral. Empyema of the sphenoidal sinus was present in twenty-nine post-mortems, while pus was found in the ethmoid cells in seven cases. In thirteen cases the frontal sinus was found affected. More than one cavity sometimes contained pus; thus, in seven of the thirteen cases of frontal empyema, pus was also found in the maxillary antrum of the corresponding side; while in two of these the frontal affection was bilateral.

Lapalle (*Arch. internat. de laryngol., etc.*, Paris, No. 3, May–June 1899) made a number of observations upon 169 autopsies, the patients dying from various causes. It is interesting to note that the existence of a sinusitis was found most frequently in patients who had died from a tubercular affection. The maxillary antrum was found most frequently affected, in forty-eight cases; the sphenoidal, and not the frontal sinus, came next in frequency, there being nineteen instances of this affection; then followed the ethmoidal cells in six cases, and the frontal sinuses in five,—making a total of seventy-eight cases. The majority were found in men.

THE PETRO-SQUAMOSAL SINUS: ITS PATHOLOGICAL IMPORTANCE.

AN interesting and instructive demonstration upon the anatomy of this intracranial blood sinus was given by Mr. Arthur Cheatle at the recent meeting of the Sixth International Otological Congress. After a résumé of its anatomical connections in some of the lower animals, he proceeded, with the aid of lantern slides, to demonstrate the anatomy of the sinus in men. In early fœtal life the petro-squamosal sinus carries the intracranial venous blood from the brain cavity into the primitive jugular, or external jugular vein. Having discharged its function during fœtal life, the sinus diminishes in size, but as a rule persists in part all through life, being connected with the middle meningeal vein in front and the lateral sinus behind. During adult life markings on the bone often sufficiently indicate its presence. If the dura mater be stripped off the roof of the middle ear in a fresh specimen, a plexus of rather large veins may be seen, some of which open into this sinus. These meningeal veins, on the other hand, have a direct communication with the veins of the middle ear; hence the middle ear may communicate with the sinuses of the middle and posterior cerebral fossæ. In this way infection may pass directly from the tympanum to the meninges and brain without microscopical evidence of the connection, the lining membrane remaining intact. In infants and children this was not an uncommon pathway of infection. In two cases Mr. Cheatle had seen septic thrombosis of the lateral sinus arise through the anatomical connections of the petro-squamosal sinus, and in all probability cases of tubercular meningitis, secondary to tubercular disease of the middle ear, arose in a similar way.

PUBLIC HEALTH.

UNDER THE CHARGE OF

CHARLES HUNTER STEWART, M.B., D.Sc.,

PROFESSOR OF PUBLIC HEALTH, UNIVERSITY OF EDINBURGH.

Protection against Infection in Railway Carriages, etc.

The report on this subject by the Commission appointed by the Société de Médecine Publique was recently presented by M. Vallin (*Rev. d'hyg.*, Paris, No. 5, tome xxi.). It concerns itself chiefly with infection from phthisical persons, as this seems the most clamant danger, considering that in France they have to cope not only with the phthisis among the travelling public of their own country, but with that among the numerous foreigners who travel by rail to the health resorts of the Mediterranean. Its recommendations, which were unanimously adopted after discussion (*ibid.*, No. 7), have been sent to the Minister of Public Works. The chief of these are—(1) That in every waiting-room and platform of a station, and in every railway carriage, notices be posted expressly forbidding expectoration on floors, etc.; (2) that spittoons containing a disinfecting liquid be put in all these places; (3) that dry sweeping of the floors and platforms be abolished, all such cleansing to be done with wetted cloths or brushes; and (4) that as far as possible wooden flooring be replaced by mosaic or asphalte, and that the floors of third-class carriages be coated with coal-tar or oil paint; in first and second-class carriages the carpets to be replaced by linoleum.

Epidemic Cholera at Camaran.

The view that the recognised micro-organisms of certain diseases, *e.g.* cholera, frequently require the concurrence of other, and often saprophytic forms, to enable them to produce the disease, is well supported by laboratory experiments. The experience of epidemic cholera between 1890 and 1895 at the quarantine station on the island of Camaran in the Red Sea (*Rev. d'hyg.*, Paris, No. 9, tome xxi.), supports it from the epidemiological point of view.

Of six epidemics during that time, which appeared among the pilgrims from Bombay to Mecca, only in one of these were there cases of cholera on board ship prior to disembarking at Camaran. In this ship there were seven deaths from cholera during the voyage, there were eight cases on board on day of arrival, and next day four cases occurred, after which the epidemic began to decline. Its height was about the time of disembarking, and its rise was evidently caused by infection in India. Among the other five batches of pilgrims, typical cholera never appeared earlier than the fifth or sixth day after disembarking, that is to say, seventeen or eighteen days after leaving Bombay, and was at least in three of these preceded by prodromal cases of diarrhœa. This diarrhœa first appeared on shipboard, one case in each of the ships, and increased in severity until classical clinical cholera appeared. The longest cholera incubation period may be taken as six days, therefore infection by the bacillus in a virulent form at Bombay is excluded. Infection on shipboard is excluded for the same reason, and also because, had a case appeared then, the disease would certainly have spread, considering the accommodation for passengers in a pilgrim ship. These epidemics began and ended in Camaran. The medical inspector at the quarantine station excludes infection at Camaran. He thinks their origin is to be explained on the hypothesis that these pilgrims carried with them from Bombay a non-virulent form of Koch's bacillus, either in their intestines, or on their clothing, etc., and that the conditions that obtained at Camaran were able to progressively increase its virulence. Keeping in mind Hankin's observations on the wells of India, one may assume that such conditions were found in the wells at Camaran. Distilled water has been for the last two years supplied to the pilgrims for drinking purposes. During that time there have been no such epidemics.

ENTERIC FEVER.

SCHUMACHER (*Ztschr. f. Hyg.*, Leipzig, Bd. xxx. Heft 3) describes a case of enteric fever in which Widal's reaction, in the dilution of 1–40, was negative though tried on two occasions. The case ended fatally after thirty-nine days, during which the temperature was often above 105° F. The post-mortem appearances were those of enteric fever, and from the spleen characteristic *Bacillus typhosus* was cultivated, which agglutinated at a dilution of 1 to 200. The heart blood gave no Widal's reaction.

He discusses the question whether agglutinating power is a phenomenon of infection or of immunity,—whether, like the rose rash, etc., it is a symptom of the disease which may or may not be present, or whether it is an important indication of the protective and resistant power of the body against the attack of the micro-organism. He inclines to the view that his case belongs to that class described by Courmont (*Rev. de méd.*, Paris, October 1897), in which an irregular and low power of agglutination of the blood, associated with a varying and often high temperature and a long period of illness, indicates the weakness of this resistance in the patient.

On account of the conflicting results obtained by different observers as to the presence of *B. typhosus* in the rose spots on the skin in enteric fever, their examination has never been used as a means of diagnosis. F. Neufeld (*ibid.*) investigated fourteen cases, in thirteen of which he found them. In twelve cases the bacillus was readily found on the first examination. In the unsuccessful case the rash was very slight, and not characteristic.

The few bacilli in these spots of rash are liable to be killed by the action of the drop of blood which oozes out even when they are superficially incised. To avoid this, he proceeds as follows:—After cleaning the skin with alcohol and ether, a superficial incision is made through the spot, and before the blood begins to ooze he gently scrapes the wound with the point of the scalpel and directly inoculates broth with the scraping. A few drops of broth are added to the oozing droplet of blood, and either broth or the condensed water in an agar tube inoculated with it. The operation must be very quickly performed, as even a portion of a minute in contact with the blood may kill the bacillus. Several spots should be examined in each case. He found the bacilli vary in virulence from case to case, in the same way as they do when separated from the fæces. The most virulent form killed a guinea-pig of 300 grms. weight in twenty-four hours with a dose of $\frac{1}{20}$ loopful of an agar culture. The bacillus from the fæces in this case had an almost identical virulence. Staphylococcus was once found as a contamination from the skin. Neither *B. coli communis* nor streptococcus were found.

ENTERIC FEVER IN PARIS.

M. THOINOT (*Ann. d'hyg.*, Paris, Nos. 2 and 3, tome xlii.) discusses the enteric fever incidence in Paris from 1870 to 1899, and also in detail the epidemic of this year. Prior to 1870 the water supply was from the river Seine and from wells, but in that year an additional supply was introduced from the valley of the Vanne and from the Dhuis, consisting of spring water, with a varying amount of surface water from cultivated land. The new supply was not sufficient for the population, and had to be supplemented with river water. Besides, in hot summers, the supply from the Vanne fell, necessitating a greater use of river water. During the period (1870 to 1893) there was a marked decline of enteric mortality, with, however, occasional epidemics. In 1870 the enteric mortality was 1·3 per 1000, while in 1893 it had fallen to 0·22 per 1000. Fever was endemic in those parts of the city supplied only with river water, with occasional epidemic explosions in those districts, and in the other districts when river water had been clandestinely mixed with that purer supply.

In 1893 a further supply of spring water was introduced from the river Arve, making the use of river water quite unnecessary, and in 1898 the enteric mortality was only a little over 0·1 per 1000. The epidemic of this year is clearly attributable to contamination of the supply from the Vanne. From the beginning of the year to 15th July there were 1500 cases notified, and during the three weeks to 4th August there were 650 cases. During the four weeks, 8th July to 4th August, the incidence per 100,000 inhabitants in relation to water supply was as follows:—Vanne alone or mixed with Arve, 47·5; Arve alone, 14·3; Dhuis alone, 12·7. Of 167 cases among the military, 154 were among those supplied only with Vanne water. Two towns get their drinking water from the Paris supply before it reaches the city, one from the Vanne and the other from the Arve. In the former there has been an unusual amount of enteric fever this summer, while in the latter there has been none.

THE STERILISATION OF WATER BY CHLORINATED LIME.

THE application of this method on the large scale was first proposed by Traube in 1894, who recommended 4·2 mgrms. (equal to more than 1 mgrm. available chlorine) per litre. After two hours the water was sterile, but its smell was disagreeable. This he removed by adding a small quantity of sulphite of sodium, which formed odourless sulphate of sodium and chloride of calcium.

Lode, working under the direction of Professor Gruber, found that much of the chlorinated lime was decomposed by the organic matter in the water, and therefore was not available for sterilisation. When 150 mgrms. per litre is used, sterilisation is produced in ten minutes. He communicates (*Hyg. Rundschau*, Berlin, 1899, No. 17) the result of experiments on a fairly large scale, 151 cubic metres; to which he added 14·2 kilos. chlorinated lime. The lime was rubbed up with sufficient water to form a thin emulsion, and passed through a fine sieve before adding to the water, with which it was carefully mixed. Though a uniform distribution was not obtained, yet by testing with iodide of potassium and starch he found that there was in all parts a sufficiency of chlorinated lime to produce sterilisation. After two and a half hours the water was sterile. The hydrated oxide of lime in the bleaching powder gives a muddiness and sometimes a soapy alkaline taste in the water, which are objectionable. These are removed by adding a small quantity of hydrochloric acid. The amount of sulphite of sodium necessary to remove the chlorinous taste varies with the amount of undecomposed hypochlorite, but, as a good working rule, it should be twice the amount chlorinated lime used. In practice he recommends per cubic metre of water, 150 grms. chlorinated lime, 180 grms. 40 per cent. hydrochloric acid, and 300 grms. sulphite of sodium. The entire expense is comparatively trifling.

This method might also be used for the sterilisation of water in public swimming baths, in preference to corrosive sublimate, which has been recommended.

REPORTS OF THE MEDICAL SOCIETIES.

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Forfarshire Medical Association.—Held in University College, Dundee, *6th October* 1899.—Dr. **Grant**, President, in the chair.—Dr. **Foggie** showed a patient, æt. 28, who, at every pregnancy except the first, suffered from an affection of the nails which most resembled psoriasis.—Dr. **Gray** showed three casts of congenital deformities in an adult; also one, of the hand of a child, in which the fingers were fused at the apices; and a cast of a large double inguinal hernia.—Mr. **Greig** exhibited a cast showing congenital suppression of digits.—Professor **Kynoch** showed—(1) Uterus removed from a patient, æt. 56, suffering from prolapse which had resisted other treatment, and stated that four months after the hysterectomy, a cystocele existed; (2) a multilocular ovarian cyst removed from patient, æt. 31; (3) a papillomatous ovarian cyst, removed from a patient four and a half months pregnant, with no bad symptoms after operation; (4) specimen showing early vesicular degeneration of the chorion; (5) Stratz's speculum.—Dr. **Buist** showed—(1) Ovaries with subperitoneal cysts removed for persistent pelvic pain following gonorrhœa; (2) a collection of ovarian cysts, in one of which there were some solid parts showing medullary cancer on microscopic examination. Dr. Buist gave the further history of two symphyseotomies previously reported. The first patient, in August of this year, was confined normally of twins, both living. The second patient was delivered of a healthy child.—Mr. **Greig** read a paper on "Anchylosis of the Temporo-maxillary Articulation, and its Relief by Excision of the Neck and Condyle of the Lower Jaw." The paper reported four successful cases, of which one was bilateral, and photographs of these cases were shown with the limelight. The etiology and the effects of the condition were considered, the anatomy of the parts about the joint was fully described, and the details given of the operation, as Mr. Greig performs it. He recommended an incision keeping the entire facial fibres and superficial temporal artery in front, and showed how the operation could be completed without the injury of any important structures. He advocated the use of the chisel to divide the bone at the condyle, or, if necessary, at the coronoid process, and claimed that by his incision the bone could be removed as low as the inferior dental foramen with no resulting facial paralysis.

OBITUARY.

SURGEON-MAJOR-GENERAL LITHGOW, C.B., D.S.O., M.D.

BY the death of Surgeon-Major-General LITHGOW, Medical Superintendent of the Royal Infirmary, that institution has been deprived of one who had its best interests at heart, while both medical and military circles regret the loss of an officer with the highest ideals of honour and duty.

"The General," as he was familiarly known, after the usual period of medical study, became attached in 1855 to the Edinburgh College of Surgeons, and in the same year joined the Stirlingshire Regiment —now the 1st Battalion of the Gordon Highlanders—as Assistant-Surgeon. He shared in the dangers and trials of the Indian Mutiny, after which he saw service in many parts of the world, and as an incident took the degree of M.D. at Edinburgh in 1876. He again returned, nearly a quarter of a century after his first appointment, to the East, as Principal Medical Officer at the base in the last Afghan Campaign. He was afterwards Chief of the Army Medical Department in Scotland, and became Deputy-Surgeon-General. In 1884, he took part in the Nile Expedition, and the earlier Soudan operations. For his services in these campaigns he received the Companionship of the Bath, and the Distinguished Service Order. After holding important posts in Egypt and Afghanistan, Dr. Lithgow became head of the Army Medical Department in India, which post was followed by promotion to the rank of Surgeon-Major-General, and the appointment of Principal Medical Officer to the Southern District.

On the death of Deputy-Surgeon-General Fasson, Dr. Lithgow was appointed Medical Superintendent of the Royal Infirmary of Edinburgh, and brought with him not only a distinguished record, but those habits of mind that had enabled him to serve his country so well in military affairs. His rare devotion to the discharge of every trust, and untiring zeal in the performance of every duty, were united with an urbane courtesy of manner, and a gentle kindliness of nature; he filled his important but difficult post to the entire satisfaction of the Managers and staff alike. Untiring in his efforts to render every assistance to those associated with him in the administration of the great institution, he freely gave his energies and experience to all in unstinted fashion, and had the satisfaction of seeing his efforts crowned by success.

Regarded usually as one of the most robust men of his age, his death on 20th September, after a very short illness, came as a great surprise to most of us, and his loss has been a subject of wide-spread regret.

William Menzies Hutton, M.D., F.R.C.S.Edin.

The premature death of Dr. Hutton has robbed the Edinburgh Medical School of one of its most promising younger men.

Dr. Hutton was educated in Edinburgh, and graduated in 1891. After serving the Royal Infirmary as House Surgeon to Professor Chiene, he studied in Berlin, Bern, and Zürich. Turning his attention to Surgery, he was Syme Surgical Fellow in 1893, and quite recently was appointed Surgical Registrar to the Royal Infirmary. His death has caused widespread regret.

MEDICAL NEWS.

A Scottish Sanatorium for Chest Disease.

Several institutions for the treatment of chest diseases have recently been opened in England, and we are glad to learn that a sanatorium is now in course of erection in Scotland. The situation which has been selected appears to meet every requirement. It is in Deeside, near Banchory, a district long famous for its climate. From information specially furnished, we understand that the region possesses a large amount of sunshine, a very equable temperature, and a remarkably low rainfall, while the site of the sanatorium is not only remarkably free from high winds, but is also largely surrounded by pine forests.

The scheme has been warmly supported by a large number of prominent physicians in Edinburgh, Glasgow, Dundee, and Aberdeen, and it bids fair to supply a want which has been keenly felt. The results which have followed the open-air treatment of pulmonary tuberculosis in Germany are sufficiently encouraging to warrant the adoption of the method in our own country, where patients can enjoy the comforts of home, and the advantages of what Ben Gunn called "Christian diet," with all the benefits of the most advanced treatment.

ANALYTICAL REPORTS.

INFANTS' FOODS (*continued from page* 305).

THE various infants' foods and articles of diet included in the notices in this and the September number of the Journal, offer physicians and parents a wide choice of excellent and valuable nutritional aids.

Infants denied their natural food, or unable to make proper use of it, may be given preparations of cow's milk, practically identical in composition with that of a mother, in the form of the Aylesbury Dairy Co.'s Humanised Milk, or that of the Friern Manor Dairy Farm; by means of the Milkmaid Brand of Swiss Milk, suitably prepared; or, after the addition of small quantities of various of the dry foods and of water to cow's milk, the resulting mixture.

Again, infants brought up on the bottle, and failing to derive sufficient nourishment from milk alone, can be helped along the path of life to health and strength by the use of "Allenburys," Benger's, Fairchild's, Frame's, Horlick's, Mellin's, Moseley's, Neave's, Robinson's, and Savory and Moore's preparations, chosen as circumstances suggest. The names of these foods have been arranged alphabetically, not in order of any suggested pre-eminence. In some cases one of these foods is tolerated when the others are refused; in many instances previous successes mark this or that food out for personal preference; all are excellent of their kind, and only require to be used with judgment and acumen to fulfil their valuable rôles.

INFANT AND INVALID'S FOOD.

(I. & I. Food Co., Ltd.)

THE food prepared by the I. and I. Food Co., Ltd., London, is intended both for infant feeding and for nursing-mothers; the amounts recommended rising from half a teaspoonful in half a pint of boiling water, or milk and water, in the case of infants under three months, to a tablespoonful made with undiluted boiling milk for adults.

It is a powder prepared from cereals, containing about 12 per cent. of proteid material, 3 per cent. of fat, 1·5 per cent. of inorganic salts, and 73 per cent. of carbohydrates free from cellulose. The food, therefore, is rich in proteids and fats, while the inorganic salts consist largely of lime and potash phosphates. The food is readily taken, easily digested, and is so constituted that it offers a large amount of properly proportioned nutriment in small bulk, and that of a character favourable to advantageous assimilation.

THE "ALLENBURYS" FOODS.

(Allen & Hanburys, Ltd., Lombard Street, London.)

ALLEN & HANBURYS wisely provide three forms of food for infants, scientifically adapted to the increasing digestive powers of the child. They are, seriatim:—

Milk Food No. 1, for infants under 4 months of age.
Milk Food No. 2, for infants between 3 and 6 months old.
Malted Food No. 3, for infants over 6 months.

The No. 1 Food is made from fresh cow's milk, from which the excess of casein is removed, and the deficiency in fat and sugar made good by the addition of cream and milk sugar. It is then pasteurised and evaporated to the form of a dry powder. It is necessary only to add boiled water to form a pure and safe infant's food, free from dangerous organisms. This food presents the constituents of human milk in their true relative proportion; it is, in short, a humanised milk in powder form, which keeps thoroughly well in any climate.

The No. 2 is similar to the No. 1 Food, with the addition of maltose soluble phosphates and albuminoids extracted from whole meal. These added materials give the necessary stimulus to the developing digestive powers of the infant at 4 months of age, and promote healthy growth. There is no unconverted starch present. These milk foods are of especial value during the summer months, when so much infantile diarrhœa is so often caused by a contaminated milk supply.

The No. 3 Food is prepared from wheaten flour, which after being cooked is heated with an active diastasic malt extract. The action of the diastase is twofold—(1) It renders the starch soluble and easy of assimilation; (2) it prevents the milk used in the preparation of the child's food from coagulating into hard lumps. Thus we have a partly digested food easy of assimilation, yet with sufficient unconverted starch present to exercise the developing amylolytic functions of a 6 months old child. It is of great service as an adjuvant to the mother's milk at the later stages of lactation, or can be usefully employed along with the No. 2 Food, in increasing proportions, as the child nears the time of weaning.

These three preparations are in powder, sterile, and of agreeable taste and flavour. Their intelligent employment and blending, and the gradual substitution of the one for the other, as directed, can do much to aid in the successful upbringing of infants deprived of, or unable to thrive upon, their mothers' milk. We heartily commend this introduction of a progressive dietary, based as it is on truly physiological and scientific lines.

BENGER'S FOOD.

(F. B. Benger & Co., Ltd., Manchester.)

BENGER'S preparations possess a household reputation. The food bearing this name, in addition to forming an adjuvant to milk for infants, can be used by those of older years, or by invalids, in the shape of puddings, blanc-mange, jellies, etc. Benger's Food is a sterile powder, with about 8·4 per cent. of water, 91·1 per cent. of organic, and 0·5 per cent. of inorganic solids. It contains unimpaired digestive ferments, called into activity on addition of warm milk or water; easily digested proteids, partly predigested; and so acts on milk, used to prepare it for administration, that clotting only produces a soft, flocculent, fine curd of easy digestion.

For infants a heaped tablespoonful is made into a paste with 2 oz. of cold milk; half a pint of a mixture of one-third milk, two-thirds water, is then added while at the boiling point. After setting aside for a quarter of an hour, to allow digestive action to proceed, the final product is brought to the boil, allowed to cool, and is then ready for use. The boiling milk and water added should have the proportion of milk raised as the child grows older, or when prepared for adults.

This food, therefore, differs from those already noticed, in that it contains active digestive ferments, capable of modifying the state of the food elements in or added to it.

The partial digestion which takes place whilst the food is standing after admixture with warm milk, renders it quite fluid, so that it can be readily administered to infants from an ordinary feeding bottle, or can be drunk by invalids as easily as milk itself.

HORLICK'S MALTED MILK.

(Horlick & Co., 34 Farringdon Road, London, E.C., and Racine, Wis., U.S.A.)

HORLICK'S MALTED MILK is certainly as valuable a preparation for the purpose of aiding the ordinary diet of infants, be they healthy or be they ailing, as any in the market. Composed of the solids of fresh sterilised cow's milk, in exactly one-half of its total; wheat flour and barley malt, each roughly forming a quarter of its bulk; and 0·75 per cent. of the bicarbonates of sodium and potassium, it theoretically offers a maximum proportion of nutritious substances, in correct relationship; while in practice proves to be as valuable as it is correct. Soluble dextrins, maltose and milk proteids, so altered by special treatment with a vegetable peptonising ferment as to be incapable of forming large curds in the stomach, make up the greater part of the food. A heaped teaspoonful in 2 oz. of hot boiled, not boiling, water, usually suits infants under three months; larger amounts being used as age advances. It is palatable, pleasant, digestible, and valuable.

MELLIN'S FOOD.

(Mellin's Food Ltd., London.)

MELLIN'S well-known and justly appreciated food for infants, children, and invalids, is prepared primarily from wheat and malted barley. In its ordinary form the food is a dry, powdery extract obtained from these substances, almost completely soluble in water, and containing dextrins, maltose, proteids, salts, along with a trace of fats. Starch is entirely absent. The proteids are in so fine a state of division, and so altered during the processes of preparation, that they are practically digestible in the stomach in their entirety. Much phosphorus, potassium, and calcium compounds are present in the inorganic ash.

In the *Edinburgh Medical Journal* for June 1897, a full detailed analysis of this food, as carried out by us, may be found. From this it is clear that the food, given with cow's milk and water in the proportions advised—*i.e.* 1 : 12 : 4—yields a mixture almost identical in chemical composition with mother's milk, although slightly lacking in fats. Such a mixture forms a very efficient substitute in lieu of the natural fluid. An ounce of the powder to the pint of milk and water, the proportion of milk used increasing with the age of the child, roughly indicates the strength of the mixture suitable up to six months; children over this age may be given double the quantity of the food in the pint.

Quite apart from the value of Mellin's Food as a substitute for mother's milk, it has often proved of undoubted benefit in older children who may not be thriving upon their usual diet, but are aided greatly by its addition to their ordinary food.

Lacto-Glycose, made by the same firm, is prepared from the food just mentioned and from fresh cow's milk. It contains a larger proportion of proteids and less carbohydrate than the last, while the addition to it of warm water alone—1 : 9—suffices to prepare it for use.

A little later in the infant's life (after dentition), Mellin's Food Biscuits may be given, to the satisfaction both of the giver and receiver.

MOSELEY'S FOOD.

(Moseley & Co., Sheffield.)

MOSELEY'S FOOD for Infants, Invalids, and the Aged, is a cereal product, appetising, nutritious, and readily assimilable. Prepared *in vacuo* by means of various digestive processes, dried in form of a powder, it is sterile and powerful. It is highly concentrated, so that a teaspoonful made into a paste with a little cold milk, mixed with 10 oz. of equal parts of fresh milk and water at the boiling point, the whole being then boiled briefly, suffices to make up a food suitable for young infants. At a later stage double the quantity of the food may be used, if advisable.

NEAVE'S FOOD.

(J. R. Neave & Co., Fordingbridge.)

NEAVE'S FOOD is one of the oldest established of our foods for infants. It is so compounded as to coincide in composition with mother's milk in its proportion of the essential food elements. Containing as it does some bran, powdered equally finely with the other constituents found in cereal products, its proportion of phosphatic proteid and salts is enlarged. Two tablespoonfuls of the food, made into a thin paste with cold water, diluted with a pint of boiling water, and then boiled gently for a few minutes, yields a gruel, to part of which fresh milk and water in equal parts may be added, and sugar to taste. These proportions suit young infants; for older children the amount of the food is to be increased. The more the milk the less the tendency to looseness of the bowels; the greater the percentage of the food, the more infrequent is constipation.

ROBINSON'S PATENT BARLEY AND PATENT GROATS.

(Keen, Robinson, & Co., London.)

As examples of substances which in themselves are not in the least degree artificial preparations, but are of the greatest value for the feeding of infants, these patent derivatives of barley and oats can be strongly recommended. The patent groats is specially capable of affording a nourishing diet for babies, and, when made into gruel with milk, is second to none in nourishing properties or in power of forming flesh and bone. We have had many opportunities of noticing the excellent results which follow the administration of oatmeal flour to infants when they have attained to the age of 6 or 7 months. To this end Robinson's Patent Groats may be employed with advantage, an additional point in their favour being the possibility of substituting for them their Patent Barley Flour, should the first at any time prove too stimulating. Gruel, made from either of these two preparations with the addition of milk, constitutes almost an ideal article of food for infants after the first six or seven months of life, as well as for invalids and dyspeptics. In the case of the groats the albuminoids bear the relation to carbohydrates of 1 to 10·8; in the barley this relation is 1 to 19. The excess of carbohydrates is lowered by the admixture of cow's milk in the preparation of the gruel to a proportion not far removed from the normal in woman's milk. Full details of the method of preparing the mixtures proper for infants of various ages are given in the notices issued by the manufacturers. From the Patent Barley Powder a most efficient barley water can be readily prepared.

PEPTOGENIC MILK POWDER.

(Fairchild Bros. & Foster, New York. Agents: Burroughs, Wellcome, & Co., London.)

"PEPTOGENIC MILK POWDER" is a dry, floury powder, made from milk so modified that the casein in it is readily digestible. It is not, as its name might be taken to imply, a product of artificial digestion, but is so treated and modified that its constituents are remarkably easily tolerated, while it, when added in proper proportion to cow's milk, renders it almost identical in composition with woman's milk. Each bottle of the powder is supplied with a metal cap, which is also the measure of the amount to be used on each occasion. One measureful of the powder, half a pint each of cold water and of fresh milk, with four tablespoonfuls of cream, are brought to the boil with constant stirring meanwhile, and then, after cooling, given in the proper quantity to the infant. The composition of "Peptogenic Milk Powder" renders the mixture made with milk in this way a most natural artificial food.

Savory & Moore's "Best Food for Infants."

(Savory & Moore, London.)

Savory & Moore's preparation is said to be self-digesting, although not predigested; its albuminoids bear the ratio of 1 to 6½ of carbohydrates, almost identical with that of mother's milk; the malt diastase contained by it aids in converting some of the starch of the food into soluble derivatives during its preliminary preparation; and it contains also all the phosphates of wheat, but no added sugars. In it maltose replaces sugar of milk, to which it is somewhat akin; but as the maltose is chiefly produced at the actual time of mixing the food with the necessary amounts of milk and water at 140° F., it has no chance of undergoing fermentation before ingestion.

Antiarthrin (Sell's).

(Reitmeyer & Co., London.)

Antiarthrin is a newly discovered remedy for use in the treatment of gouty and rheumatic affections. Chemically it is a tannate of saligenin, obtained through the action of dilute hydrochloric acid, salicin, and tannin together; tannate of saligenin results, along with some saligenin, salicin, glucose, and a trace of free hydrochloric acid. It is not soluble in water, but easily dissolves in alcohol and alkaline solutions. Owing to the trace of free acid contained by it, antiarthrin should be given in its usual form of a powder, or in tablets. We have not had an opportunity as yet of trying the effect of the drug, but the descriptions of the effects obtained from its employment in gouty and arthritic cases by various medical authorities, bear witness to its value in many instances. It is said to be an anodyne of great power in these conditions—diuretic, sudorific, a uric acid solvent, and a digestive tonic. As received by us, antiarthrin is put up in separate powders of 16 grs. each, one or two of which form a dose, the total amount to be taken in twenty-four hours varying from 48 to 160 grs., according to circumstances.

Kryofine.

(Reitmeyer & Co, London.)

Kryofine is another new therapeutic agent prepared by the Basle Chemical Works, of which Reitmeyer & Co. are the representatives in this country. Chemically it is methyl-glycolic-acid-phenetidin, and is thus closely allied to phenacetin; $CH_3O.CH_2.CONH.C_6H_4O.C_2H_5 + H_2O$, stands for the composition of the compound. It is described as possesing all the powers of phenacetin, but in half the dosage, and without producing any depressing effect whatsoever. That is to say, kryofine is antipyretic, analgesic, and hypnotic, in doses of from 8–15 grs. In substance it forms a white, odourless, and tasteless crystalline powder, soluble 1–600 cold, 1–52 boiling water, and readily in alcohol, ether, glycerine, etc. In fifteen minutes after ingestion, as a rule, the urine gives evidence of its presence on addition of ferric chloride. It has been employed with good results in influenza, enteric fever, pneumonia, for its antipyretic qualities, and in insomnia and neuralgia as a hypnotic and analgesic.

TAKA DIASTASE.

(Parke, Davis & Co.)

WE have already expressed a favourable opinion upon the remarkable success which frequently follows the use of Taka Diastase, and the great diastasic power that this product of a fungus possesses. A more prolonged experience of its properties has only served to confirm our earlier experience. One of the chief points in its favour consists of its greater resistive power against the action of acids than the malt or pancreatic ferments can boast of.

ERGOT ASEPTIC.

(Parke, Davis & Co.)

SAMPLES of extremely neat and fascinating little bottles, each containing 1 c.c. of a liquid preparation of Ergot, sealed hermetically by fusion of the end of the glass neck, and to be opened by simply breaking the neck across at a level already scored with a file-furrow. The entire contents represents one dose, equal to 2 grms. of ergot, or 30·8 grs. The aseptic character of the contents proved on trial to be absolute, while the entire absence of ergotinic acid and of extractive material renders the preparation most satisfactory for hypodermic injection. The assurance that, with proper care in sterilising the syringe used, there is no fear of trouble arising from decomposition of this fluid preparation of ergot, nor from irritating constituents, should suffice to indicate to practitioners that the ergot aseptic of Messrs. Parke, Davis & Co. is a most valuable preparation for hypodermic administration, convenient to carry about, and always ready for immediate use.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,
MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

Meteorological Means for the East of Scotland District, for the Five Weeks ending Sept. 30, 1899; and for the Year from January 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	52°·6	[1] 417°	4°	3·5	22·8	139	1106	2°·5
		[2] 2054°	653°					
Observed	52°·4	[1] 378°	8°	4·7	24·5	129	1176	2°·5
		[2] 2211°	677°					
Difference	−0°·2	[1] − 39°	+ 4°	+1·2	+1·7	−10	+70	±0°
		[2] +157°	+24°					

Vital Statistics.

Mortality in Four Large Towns in the East of Scotland (Edinburgh, Dundee, Aberdeen, and Leith), during Sept., and since January 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 957	167·5	191	33·5	86	15·1	121	21·2	116	20·3
	[2] 9,902	192·1	1966	38·1	937	18·2	1838	35·6	1128	21·8
Actual Deaths and Rate per 10,000	[1] 1,074	188·0	212	37·1	93	16·3	102	17·8	110	19·3
	[2] 10,058	195·1	2106	40·8	931	18·0	1622	31·4	1168	22·6
Difference from Mean	[1] +117	+ 20·5	+21	+3·6	+ 7	+1·2	−19	−3·4	− 6	−1·0
	[2] +156	+ 3·0	+140	+2·7	− 6	−0·2	−216	−4·2	+40	+0·8

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 90	15·8	27	4·8	49	8·6	82	14·3	52	9·1
	[2] 659	12·8	258	5·0	708	13·7	978	18·9	435	8·4
Actual Deaths and Rate per 10,000	[1] 140	24·5	32	5·6	45	7·9	92	16·1	58	10·1
	[2] 772	15·0	258	5·0	749	14·5	974	18·82	520	10·1
Difference from Mean	[1] +50	+8.7	+ 5	+0·8	− 4	−0·7	+10	+1·8	+ 6	+1·0
	[2] +113	+2·2	± 0	±0	+41	+0·8	− 4	−0·08	+85	+1·7

* Note.—The figure [1] denotes the data for September, [2] for year to date.

The mean temperature during the five weeks ending 30th September (by mistake five weeks, instead of four, were discussed last month) was practically equal to the average, although the accumulated degrees of warmth over 42° were considerably below the normal, those below 42° above it. The rainfall was heavy, the hours of bright sunshine fewer than usual, the mean daily variability of temperature the average.

Since the beginning of the year the figures for both the accumulated degrees of warmth and of cold are above the normal, the excess of the former being 7·6 per cent. to the total expected; the rainfall and number of hours of bright sunshine afford very similar proportionate increases.

The total number of deaths in September was 117 over the normal, an excess equal to 12 per cent. of the expected figure. This excess was almost entirely due to constitutional and digestive diseases, especially the latter, with 55·5 per cent. increase over the average number for the month, or 8·7 per 10,000 in rate.

Respiratory deaths show a decrease of 15·7 per cent. as to the average. Only two deaths were registered as due to influenza.

For the year to date the total mortality is somewhat higher than usual; the increase, falling chiefly under the headings of constitutional, digestive, and cancerous diseases, with 7·1, 17·1, and 19·5 per cent. increase as to the normal figures respectively. The only marked decrease occurs under respiratory causes, equal to 11·7 per cent. of the average.

September, therefore, of almost average mean temperature, with a heavy rainfall, lack of sunshine, but a normal variability of temperature, shows an increased mortality, especially from digestive and constitutional causes, but diminished from respiratory diseases. To date, the year, warm, with increased rainfall, though sunny, exhibits a marked increase under constitutional, digestive, and cancerous diseases.

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APPENDICITIS: THE RESULTS OF OPERATION IN 117 CASES, WITH SOME CONSIDERATIONS ON THE QUESTIONS OF DIAGNOSIS, OF RECURRENCE, AND OF MORTALITY.

By GILBERT BARLING, M.B., F.R.C.S., *Professor of Surgery, Mason College, and Surgeon to the Birmingham General Hospital.*

APPENDICITIS or perityphlitis has been, during the past few years, a constant subject of discussion and consideration. The interest has been maintained, no doubt, by the recognition of the frequency with which the disease occurs, the tragic terminations to valuable lives for which it is responsible, and above all by the success which its treatment by operative measures has now attained. Great as that success has been, the mortality is still higher than it should be, and preventible deaths occur with considerable frequency. To these I wish, in the present communication, to draw attention. Other points well worth consideration are—the time to operate when localised suppuration is recognised, whether the appendix should be systematically removed in such cases, and if this is not done, the probability of further attacks. I have collected all the cases upon which I have operated, 117 in number, up to March 1899, with the expectation that they will afford some information on the questions raised. Forty-two were operated upon in a quiet interval, and so may be placed on one side as of no value for my present purpose. The only observation I wish to make upon them is, that only one of these forty-two patients died, a result which goes to confirm the belief that interval operations in appendicitis carry with them very little risk to life. The remaining seventy-five cases may be separated into four groups:—

1. The "safe" abscess, in which the pus is localised by adhesions from the general peritoneal cavity, and the abscess is

adherent to some part of the anterior parietal peritoneum, so that the surgeon opens directly into the pus without risk of infecting the general belly cavity.

2. The "non-adherent" abscess, in which the pus is shut off by adhesion from the general cavity, but the abscess is not adherent to the anterior parietal peritoneum, and the operator has to open the general cavity to seek the pus and evacuate it, and so runs the risk of general peritoneal infection.

3. The "subacute" widespread suppurative peritonitis which approximates to the next class, but is not so acute in the onset, and though the pelvis and lower part of the abdomen may be widely involved, there is considerable tendency for the inflammation to be limited by adhesion, and the peritoneum above the line of the transverse colon generally escapes.

4. The "acute" fulminating peritonitis, due to perforation or gangrene of the vermiform appendix, before limiting adhesions of any degree have formed, or to rupture of an abscess previously shut off from the general peritoneal cavity. In these the onset is very acute, and the inflammatory mischief rapidly spreading is without limits of a definite kind, though even here the term "general" peritonitis may be somewhat of an exaggeration, as the transverse colon makes a barrier which not infrequently marks the limit of the peritonitis.

Arranging my cases in these four groups, I find that Group 1, which I have described as "safe abscess," comprised nineteen patients; of these, eighteen recovered and one died. The abscesses varied in extent from a few drachms of pus to a pint or more. They were treated by incision into the most prominent part of the swelling, and drainage; and in no instance was the vermiform appendix removed. Despite this, only one patient suffered from recurrence, a young lady who was allowed up six weeks after her operation, the wound then being soundly healed. When stooping to pick up something off the floor, she was seized with severe abdominal pain, and the next day had severe and widespread peritonitis. I removed her vermiform appendix, around which there was a small collection of pus; and it is probable that this small abscess had ruptured in the act of stooping and infected the general cavity. The patient made a good recovery from her second operation. The only death occurred in a man aged 60 years, in whom a large abscess had formed very insidiously, and with little evidence of its existence. This was treated in the simplest manner by incision and drainage, but the old man died two days after, apparently from mere exhaustion. No post-mortem was allowed, but there was no suspicion of peritonitis or other complication.

In Group 2, "non-adherent abscess," there were twenty-one cases, all of which recovered from the operation. In thirteen patients the vermiform appendix was not removed, and in none of these, so far as I can learn, has there been recurrence, but I ought to mention that three hospital cases have been lost sight of for some time and cannot be traced.

Whilst the mortality was nil, some other drawbacks have to be recorded. One patient has a sinus remaining three years after his operation, and one suffers from a bad fæcal fistula, which two operations have failed to close. The operation for his abscess, and for the removal of his vermiform appendix, was a severe and prolonged one, as he had suffered for years with recurrent attacks. An abscess was found at the distal end of his appendix, which ran up behind the ascending colon to the under surface of the liver.

The after history of another case in this group is very interesting. The patient, a married woman, came under my care four years after the operation at which her appendix was removed, for internal strangulation due to a band near the old scar. The gut was gangrenous at the point of constriction, and was resected with immediate union, as the part involved was high up the small intestine. The patient was six months pregnant, and aborted two days after the operation, and died twenty-four hours later.

In Group 3, nine cases occurred, with three deaths. In only one of these patients was the appendix removed, and a good recovery followed. In the remaining eight, three deaths occurred, leaving five patients exposed to the possible risk of recurrence. Four of the patients have been followed up, and have remained well (except that one has still a sinus left after four years), the fifth patient has been lost sight of. Of the three patients who died, one died from exhaustion from profuse suppuration at the end of two days, one from peritonitis, and the third from rupture of the œsophagus during the act of vomiting, with extravasation into the mediastinum. Convalescence with most of these patients was protracted and full of anxiety. In three cases, where the pelvis was obviously full of pus, operation was by median incision.

In Group 4, twenty-six cases are comprised, showing fifteen recoveries and eleven deaths, a mortality greatly exceeding that of all the other groups together. In this group the vermiform appendix was either gangrenous in greater or less extent, or was perforated by a concretion; in either case without limiting adhesions to localise the mischief, or a previously localised abscess had burst into the general cavity, or possibly an abscess in a stenosed appendix had become extravasated. Whichever of these was the starting point, an intense and rapidly spreading peritonitis ensued. The infection in several patients had not, I believe, extended above the transverse colon; when it had, and the subphrenic spaces were involved, recovery was, I feel satisfied, extremely rare. Worst of all cases were those in which a localised abscess had ruptured and a large quantity of infective material had at once flooded the peritoneal cavity. In fifteen cases the vermiform appendix was removed, with eight recoveries and seven deaths. In the remaining eleven cases the appendix was not removed, seven of the patients recovered and four died. At first sight it appears, therefore, that it is safer in these fulminating cases not to remove the appendix, the proportion of recoveries being greater than when it was left; but, looking carefully over my notes of the individual cases, I do not feel justified in forming this conclusion. Each case must be judged on its merits. Often the appendix is easily found, unobscured by adhesion, and should then certainly be removed; if it is not easily discovered, any considerable search is to be deprecated, as patients in this most severe illness bear prolonged anæsthetisation and manipulations very badly. The fifteen patients who recovered have been kept under observation for a time varying between a few months and as long as five years. In only one case has there been recurrence. This patient, a young man of dissolute habits, was operated on by median incision when he was extremely ill, and recovered after a long convalescence. Six months later he suffered another very severe attack, and was again treated by opening the abdomen in the middle line, but he died two days afterwards. At the autopsy much old and new adhesion was found around the cæcum and appendix, a concretion lay outside the appendix; but as there was no perforation then existing, this had evidently escaped at the time of the first attack: an old band of adhesion so constricted the upper part of the rectum as to narrow it considerably, with resulting fæcal accumulation above.

A summary of the results shows—

Group 1 .	. 19 cases.	18 recoveries.	1 death.
Group 2 .	. 21 „	21 „	0 „
Group 3 .	. 9 „	6 „	3 „
Group 4 .	. 26 „	15 „	11 „
	75 „	60 „	15 „

Or a mortality of 20 per cent. on the whole series.

It is not suggested that this is the mortality of the disease, neither is it the mortality of the operation, but unfortunately, in many instances, it is the mortality of delay. During the same period over which these operations have extended, I have seen a somewhat larger number of cases in which operation has not been called for. Two patients died without operation—one young girl, who was moribund when I first saw her; and one young boy, who was suffering from pneumonia as well as appendicitis in its most acute form.

I have for some time held the belief that the mortality is higher in children than in patients of all ages, and this is fully borne out by the figures, which show that twenty-four of the patients were 15 years old or younger. Amongst them were seven deaths, giving a mortality of nearly 30 per cent.; that is, about half as high again as the general mortality.

Although many of the cases were intensely septic, very few complications arose; phlebitis in the veins of the leg occurred four times, and in one patient it was double, and complicated with pneumonia. Pleurisy arose in two cases; in one it was double, and gave rise to great anxiety; and in two other patients pneumonia added to the dangers. Only one patient of all these, with complications, died, from general peritonitis with double pneumonia. One other case is worth mentioning, in which the appendical abscess burst into the bladder; happily the patient made a good recovery.

After this résumé it will be convenient to say a few words as to the diagnosis and treatment of each class of case. For my present purpose, all localised abscesses, whether of the "safe" or of the "non-adherent" kind, must be considered together.

I have elsewhere described minutely the features of an attack of appendicitis, as it occurs in the mildest up to the most intense form, and here I purpose to emphasise the more important points only. Speaking in general terms, when an abscess forms, the onset is of considerable but not of extreme severity. Generally, colicky pain is widespread over the abdomen, and lasts for some hours, being most marked at the umbilicus, and then the pain becomes localised to the right iliac fossa, which is tender in a marked but not extreme degree. Vomiting is almost always present, but is not persistent, and occasionally is absent altogether. The pulse and the temperature are usually a good deal raised in this initial stage, the pulse up to 100 or 110, the temperature to 102° or 103°, or possibly higher. No definite "tumour" can be felt in the right iliac fossa, for the muscles here are so rigid and the tenderness so marked that palpation cannot detect anything beneath the abdominal wall. The patient looks ill, but has not the pinched expression of the fulminating attack. So the first two or three days of the illness pass with a tendency to subsidence rather than to an accession of symptoms, and in not a few cases it looks as though the attack would go on to complete recovery. A distinct mass can now generally be outlined in the iliac fossa, the tenderness and rigidity being much lessened; the temperature, though still continuously raised somewhat, may fall for a day or two to nearly normal, and the pulse also. Then we have the positive signs of pus. The mass in the iliac fossa increases in size, or at all events does not lessen as it would do if resolution were to be expected, and the tenderness becomes more and more marked. The pulse increases in frequency again, though it probably does not attain the rapidity found in the first twenty-four hours of the attack, and the temperature assumes the hectic type, running up to from 101° to 104° in the evening, and remitting from 2° to 4° in the morning. The aspect of the patient is not characteristic of severe abdominal inflammation, but is such as accompanies an acute suppuration in any part of the body. A rigor is an exceptional event, fluctuation is not to be felt in the early days, nor until a considerable collection of pus has formed; redness and œdema of the skin are also late phenomena. I do not wish here to take up much more space in describing the variations from this outline of typical abscess cases, for it is beyond my present purpose. It should be mentioned, however, that occasionally abscesses may be formed most insidiously, and may best be described as latent. Not only are the local phenomena ill marked, but the temperature is also misleading, being normal or approximately so. In two or three cases of this kind, I have noted, however, that the temperature is not so misleading as at first sight appears. Although in the evening it may never go higher than 99° or 98°·8, in the morning it may fall to 98° or even 97°, remitting from 1° to 1½° and even 2°. If this continues for two or three days, it is very suggestive of quiet suppuration. Other points requiring careful notice are the state of the tongue, not steadily clearing as in ordinary cases of resolution, but continuing furred with a tendency to dryness, and with this the patient looks ill and anæmic. If, under these circumstances, no tumour can be felt in the iliac fossa, investigation by rectum or vagina may discover one, and examination under an anæsthetic may reveal something which could not be felt before. The main features of abscess formation are, then, an increasing tumour, a hectic temperature, and persistent local tenderness. Rigor, fluctuation, redness, and œdema may be present, but are not necessary to the diagnosis; in fact, no one indication should be regarded as essential in the diagnosis if other phenomena are distinctly present. If abscess is diagnosed, when should pus be evacuated? The answer is, as early as possible. Truly the abscess may not have become "safe" by adhesion to the parietal peritoneum, and so, in evacuating the pus, the general cavity has to be opened, with the possibility of widespread peritoneal infection. My own cases show, however, that this danger is a slight one, for in no instance of circumscribed suppuration has harm followed its evacuation transperitoneally. The objections to delay are—(1) The danger of rupture of the abscess into the peritoneal cavity. (2) The possible extension of the pus into any region rather than to one where it can be safely opened; it may be behind the ascending colon, towards liver and diaphragm, downwards into the pelvis, backwards into the loin, and so on. Death or long convalescence results from the extensive destruction of tissues, or from an accident such as suppurative portal phlebitis.

When operation has been decided upon, the point of chief importance is the position of the incision. There should be no clinging to any particular point or line as a guide, but every possible attention should be paid to getting directly down on to the pus. At the same time, muscular tissue should be divided as little as possible, to avoid the weakness of the abdominal wall, and hernia which is apt to follow the evacuation of appendical abscess. The method of incising the abdominal wall, the closure of the wound, and the drawbacks of draining, will be referred to later on. In the early evacuation of abscess, it will not infrequently be found that the part where pus is believed to exist is resonant and not dull. This may be due to free gas in the abscess cavity, or to intestine lying in front of it, and possibly adherent to the parietal peritoneum. For this reason great care should be taken as the deeper layers of the parietes are divided. They are often much infiltrated and altered, making it difficult to decide what tissues are arrived at. Proceeding thus cautiously, if the abscess be the "safe" or adherent abscess, the pus may well up beneath the surgeon's finger without his having recognised that he has divided the peritoneum, and an escape of fœtid gas explains why in some cases resonance existed where dulness might reasonably have been looked for. If the abscess is of the "non-adherent" variety, the operator either opens into the general peritoneal cavity or happens upon adherent intestine, in the latter case the intestine being occasionally opened by mistake. Should this accident occur, the opening in the intestine should be plugged, and with the finger the coil should be freely liberated, and the opening sutured in the usual way with Lembert's stitch. The abscess has now to be sought for, but before commencing the search sponges should be carefully packed at the upper and lower part of the iliac fossa and towards the middle line, to protect the pelvis and abdominal cavity. The finger then seeks the pus where the matting of the parts indicates that it may be found. If the cæcum is adherent in the iliac fossa, the adhesions should be separated on its outer side, as being the commonest position for abscess, and the point where it can be evacuated with the least risk of general peritoneal infection; if pus is not found here, then it may be located by stripping up the lower free end of the cæcum, or on the inner side of the colon, circumscribed by adherent small intestine and omentum. As soon as pus is liberated, it should be carefully mopped up, and the patient turned on his right side to facilitate the escape of the matter. The abscess cavity, whether of the "safe" or of the "non-adherent" variety, is now gently sponged out, and the finger searches its walls to identify the vermiform appendix, if that be possible. If the offender is recognised, and can be removed with but moderate disturbance, this should be done, but not otherwise. The figures I have quoted in the earlier part of my paper show how rarely relapse follows if the appendix is not removed. Fæcal concretions not infrequently lie loose in the abscess cavity, and should be carefully sought for, lest they remain behind and keep up a long-continuing sinus.

I have said nothing about irrigation, because, whatever its utility in widespread peritonitis, here it is not only unnecessary but dangerous, from the possibility of it conveying particles of infective material outside the area already involved. I am in the habit of closing the incision, as far as free and thorough drainage will allow; but the latter is a precaution I take in all cases, using either tube or gauze, or both combined.

Leaving now the subject of circumscribed abscess, I turn to Group 3, which stands between the ordinary cases of appendical abscess and those of acute fulminating peritonitis from perforation, or one of its equivalents. In this group we have suppurative peritonitis, widespread and ill defined, beginning probably as an ordinary infective peritonitis, but, owing to the moderate amount of infection, or to its less intensity, or to increased resistance on the part of the patient, the inflammation does not go on spreading indefinitely, and the products are well-formed pus.

Examining my notes, I do not find that there is anything particularly suggestive in the onset of these cases, except that it is pretty severe, that diarrhœa is apt to take the place of the usual constipation, and pain and difficulty in micturition are often complained of. At the end of three or four days, the temperature, up till then continuously raised, becomes of the hectic type, and pain and tenderness are no longer localised to the right iliac fossa, but have extended to the part where the pus is wandering. This is most commonly to the pelvis, and we have, indicating its presence here, rigidity and tenderness of the lower half of the abdominal wall, with dulness on percussion, extending it may be as high as the umbilicus. The bladder should be emptied with the catheter in such cases as a matter of routine, as it is very likely that the patient is unable to empty it by his unaided efforts; but even when the bladder is empty, a considerable portion if not the whole of the dulness remains.

In dealing with these cases by operation, the object of the operator should be to get as directly as possible down on to the pus, and with this object in view he should plan his incision, it may be in the usual position across the omphalo-spinous line, through the rectus, or in the middle line. If the latter position is chosen, care must be taken, especially in children, to avoid opening the bladder, which, though emptied by the catheter, is apt to be fixed by adhesion, so that its apex may easily be cut into as high as 3 in. above the pubes. When the pus is reached, I adopt pretty much the same line of treatment as when the ordinary circumscribed abscess is being dealt with. The appendix is removed only when this can be done easily and with little search, sponging is to be preferred to irrigation, and the wound is closed as far as is compatible with efficient drainage. Secondary pockets of pus may exist, and should be carefully sought for with the finger amongst the coils of intestine forming the abscess wall.

I have now only left Group 4 to discuss, containing the cases of acute fulminating peritonitis arising from an unprotected perforation, or one of its equivalents, in which a considerable and it may be a very large quantity of infective material floods the peritoneum. The mortality is terrible; eleven deaths in twenty-six cases, and nearly all deaths in patients below 20 years of age, thus cutting off many years of valuable life. It is to these fatal cases that attention should be strenuously directed, to determine how such a severe mortality may be diminished. In acute fulminating peritonitis, with perforation or gangrene of the appendix, we generally have in its typical form an onset marked by very severe general abdominal pain and tenderness in the right iliac fossa. The attack of pain is accompanied by vomiting, which commonly occurs repeatedly. The pulse increases steadily until it is 110, 120, or even considerably quicker, especially in children. The temperature rises rapidly from 2° up to 5°, and the face marks the patient as very ill, being drawn and pinched. Severe as is the attack just outlined, there is an even more intense condition brought about by the rupture and diffusion of a pre-existing abscess. When this happens, the patient, hitherto only slightly ailing, or at all events not seriously ill, experiences sudden and intense pain in the lower part of the abdomen, extending probably into the bladder and penis; he is more or less collapsed, his pulse and temperature quickly rise, and vomiting sets in, whilst in a brief time the lower part of the abdomen becomes rigid and tender.

With these differences in the onset, these varieties of the most acute form pursue much the same course afterwards, though the cases of ruptured abscess advance more quickly to a fatal end. In from twelve to twenty-four hours the pulse remains as quick as it was in the initial stage, or has gone on increasing in frequency; it sometimes is hard and wiry, but is more often quite soft. The temperature remains considerably raised, or may have fallen somewhat, or have become even subnormal; vomiting may be persistent in spite of the interdiction of mouth-feeding, or hiccough may take its place; the respiration is quick, shallow, and mainly thoracic. On palpation, the lower half of the abdomen is rigid and intensely tender, especially in the right iliac region. The bowels do not expel either fæces or flatus, though this is not an absolute rule. The patient either lies rigidly on his back with his knees drawn up, or restlessly turns about from side to side. If the disease is not cut short by operation, its progress is marked by the extension of rigidity and tenderness over the whole of the abdomen, by the facial expression of pain and severe illness passing into the sunken and livid aspect seen only in severe general peritonitis. The pulse still increases in rapidity, the temperature varies from subnormal to several degrees above. The vomiting generally continues, and there is absolute constipation, rarely there is diarrhœa. Death may occur within forty-eight hours of the onset, but more commonly two or three days later.

Whilst the above outlines of appendicitis in its varying forms are generally true, it must be acknowledged that at the commencement of an attack it is often impossible to determine whether it is to become one of moderate severity, likely to end in resolution, in abscess, or in a quickly spreading peritonitis. To prevent himself falling into error, and to protect his patient from possible calamity, it is the duty of the medical adviser to see his patient at short intervals in the first three or four days of the attack. To do this without any preconceived notion that there is some fixed period at which operation may be done, and not earlier, and to weigh each symptom which is present rather than laying stress upon one which is absent. It should be recognised that in nearly every case there is a time when successful intervention is possible. The purpose of all should be to seize the opportunity, without resorting to operation in milder cases capable of recovery with less severe measures.

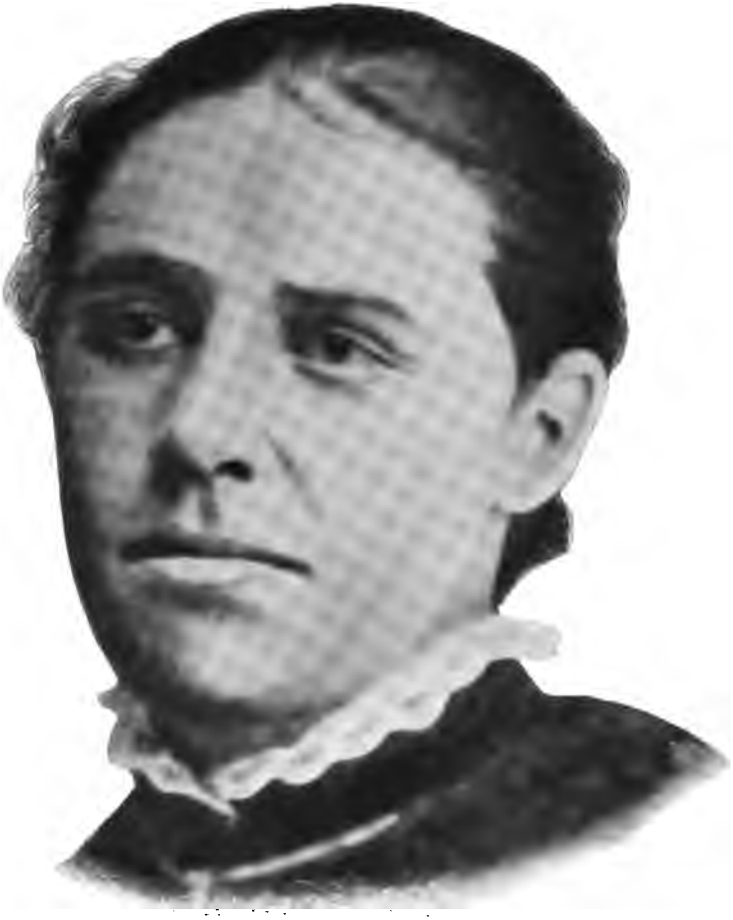
After these general observations, it is necessary to particularise as to when interference is called for in the most acute attacks. The most intense, as already mentioned, are those of extravasated abscess. The following is a brief outline of such a case:—A man of middle age, suspected of suffering from appendicitis, is being examined by his doctor, whose hand is palpating the right iliac fossa. Suddenly the patient exclaims, "Take your hand away, doctor, you have given me a frightful pain right down into my penis." The patient then became rather faint, and continued to suffer intense pain in the lower part of the abdomen, which could hardly be relieved by morphine. The doctor came to the conclusion that he had probably ruptured and diffused the contents of an abscess, and I confirmed this view in consultation about five hours afterwards. At this time the patient was quite collapsed, his face anxious and sweating, pulse 120 and very feeble, temperature 98°: the abdomen was tender and rigid, and there was diminished resonance in the right iliac fossa and hypogastrium. An hour later I opened the abdomen in the right iliac fossa, and let out about half a pint of sero-purulent fluid, lying amongst the intestines without any limiting adhesions; the patient was so collapsed that no search was made for the appendix. A drain was inserted, the wound sutured, and the patient put quickly back to bed. Eventually a good recovery followed, and the patient has remained well. There can be practically no doubt as to what happened in this case—an abscess was extravasated into the peritoneal cavity, with intense shock resulting.

The time to operate in such a case is as immediately as possible after the accident, before general sepsis has resulted from the incubation of a huge dose of infection. A few hours' delay in such a case places it beyond the pale of relief by surgery.

With the ordinary case of perforation or gangrene, diagnosis is perhaps not clear for twenty-four hours, and operative interference is not very urgently required. If, however, at the end of that time, the pulse is higher than 110, the patient is still vomiting, the right iliac fossa is very acutely tender, and the patient's face shows much distress, he is within a brief distance of the time when operation will be required. Further quickening of the pulse, or any extension of the tenderness, or distension, commencing in the lower part of the abdomen, indicate the necessity for operation. The temperature is an uncertain guide; if it is much raised it is a bad indication, and a low temperature may be equally so. To repeat what I have made almost an aphorism: "The great thing in recognising one of these cases is not to take any one point as essential to diagnosis. It is desirable to dwell not so much upon the absence of one particular feature, as upon the intensity of those that are present." In children, the higher rate of mortality calls for operation when in those who are older somewhat greater delay may be justified. If the patient is at such a distance from his medical adviser that frequent supervision is not possible, it is better to operate in a case where the pros and cons are equally balanced, rather than risk the advance of the disease to such a point where operation may be too late to arrest the mischief.

When operation has been decided upon, the position of the incision will be decided in the first instance by any tumour or thickening which can be felt. It is desirable to cut down as directly as possible on to any inflammatory collection without disturbing the parts around. M'Burney's incision, a nearly vertical division of skin and external oblique with transverse division or separation of the deeper structures, is often possible here as in "interval operations," the object being to weaken the abdominal walls as little as possible. At the same time the primary consideration is of course the safe removal of the focus of disease, and the operator should not embarrass himself with any other consideration. When the abdomen is opened, it is generally possible to remove the appendix, but it is not essential to success that this should be done, and prolonged search for the organ is not desirable. The affected area should be carefully sponged out and not irrigated, and the wound should be closed with careful provision for efficient drainage. If the symptoms indicate that the patient has a widespread peritonitis, the abdomen should be opened in the middle line, and through this incision the appendix may be also removed. If it cannot be, a second incision may be made in the right iliac region for its removal, but this should only be done if the patient's general condition justifies it; but, as before pointed out, the removal of the perforated organ is not essential to success; it does, however, cut off a possible continuous source of infection. The belly may now be cleaned either by gentle but thorough sponging, or by irrigation, preferably, I think, by the latter; but irrigation should be used in such a manner as to avoid driving particles of infection to the upper part of the abdomen, unless it is clear that the peritonitis is truly general; drainage of both incisions is desirable, but the wounds should be sutured as closely as is compatible with this. The weak scar, possibly to be followed by a hernia at the position of the drain, has to be acknowledged; nevertheless, I regard a drain as imperatively required in most cases operated on in an acute stage. The arguments against draining in other abdominal conditions do not, in my opinion, apply here.

In discussing on paper when to operate in appendicitis and when to abstain, I always realise how difficult it is to convey to others what may be clear to one's own mind. The distinctions drawn are generally differences in degree and not in kind between the more and the less intense, and on a proper appreciation of these depends so much. If the intensity of certain symptoms is not given due consideration, the patient may be left without operation until such a time as makes it unavailing to save his life; or, on the contrary, if the severity of other symptoms is given undue weight, operations will be performed which are not essential to patients' recoveries. The difficulty in differentiating between those cases requiring operation and those in whom it may be withheld, is used as an argument for operating in practically all cases early. Working on these lines, the mortality will undoubtedly be low, far lower than the 20 per cent. shown in my acute cases, but many unnecessary operations will be performed; and it must be remembered that this percentage is not the mortality of the disease but only that of the severest forms of it, such as naturally gravitate at once to the surgeon. I have not thought it necessary to operate in more than half the cases I have seen, and I can say, from regular inquiry afterwards, that the subsequent course of events has justified me in abstaining in the acute stage, though I have removed the appendix in many of those cases when the acute attack has quieted down. I do not wish to dogmatise, but my judgment at present leads me to select my cases for operation in the acute stage, and not to operate indiscriminately. If the patient can reasonably be left in the acute stage, and operated on in quiescence afterwards, this is the course I would always elect. But I would rather do two or three operations in which recovery might be possible without, than leave one case until too late. The harm done in the latter instance would, I am sure, be the greater of the two.



Acromegaly ; appearance before the onset of the symptoms—age 25.

ACROMEGALY.[1]

By G. A. Gibson, M.D., D.Sc., F.R.C.P.Ed., *Senior Assistant Physician, Edinburgh Royal Infirmary.*

(Plates VII.-XIII.)

As it is our duty in teaching clinical medicine to prepare you for the practice of your future profession as an art, in which the greatest part of your work will consist in the investigation of everyday affections, and the relief of common symptoms, a large proportion of our mutual study is devoted to diseases which are of frequent occurrence. From time to time, however, as occasion offers, it is in our power to bring before you instances of rarer morbid conditions, which may usefully arrest your attention for a time in the midst of your devotion to the usual routine of the wards. A most interesting example of a striking, and by no means common, disease has been under your observation for some weeks, and before the patient leaves the Infirmary for her home, it seems fitting that we should together review the facts of her case. Without further preface, therefore, let me bring before you the entire group of symptoms which have been thoroughly collected by the clerks in charge—Miss Adams and Miss Smith.

M. C., æt. 42, unmarried, housewife, born and residing in the county of Kinross, was admitted to Ward 27 on the 21st February 1899, complaining of weakness and stiffness in the back and limbs, with enlargement of the body; the duration of the illness was seventeen years.

History of the Patient.—The following facts were ascertained:—

Hereditary tendencies.—Her father died at 84 of "old age"; he had always been healthy. Her mother was alive at the age of 77; she was rheumatic, but otherwise well. One brother had died at 37 of phthisis. One brother and two sisters were alive and healthy.

Social conditions.—The patient had always had a very comfortable home and plenty of good food. She had taken a moderate amount of tea, and a little alcohol medicinally. Before her illness she was a lady's maid, and her duties were very light.

Previous illnesses.—She could not remember having had any childish illnesses, but for several years she was subject to heavy winter colds.

Present illness.—The commencement of her illness was as follows:—Seventeen years ago, when she was 25 years of age, and in a situation, she had a sore throat. (Her appearance at this period is given in Plate VII.) A doctor was consulted, who called it "diphtheritic." She remained in bed for three days, and used a gargle for her throat. After this illness her friends remarked that she did not look well, and she always thought her present condition began with it. She never regained her health after the sore throat left her, but became anæmic. A few months later the patient noticed her hands beginning to swell, and they became very painful, the pain being most acute at the phalangeal joints, and worst at night. After a time, however, the swelling gradually subsided, and the hands became less painful. She did nothing for the swelling except soak them in hot water, which relieved the pain. After the swelling subsided she noticed her joints felt "knotty." A few months after the hands began to swell, she again consulted the doctor, who told her she was suffering from rheumatic gout, and gave her some medicine, which she took for some time without any benefit. A month after consulting the doctor the catamenia stopped. She was then ordered a course of Turkish baths, and some medicine, but menstruation was not re-established; once only, twelve years ago, did the catamenia appear. The doctor thought Forres did not agree with her, so she went home to Kinross-shire. After two months' holiday she felt better, and took another situation for two years, during which time her illness apparently made no advance, though the hands remained slightly enlarged. She then returned home for family reasons, and was tolerably well for some months. After this she began to feel languid and tired on exertion; she also felt sleepy all day, and at night fell into a "dead heavy sleep." She noticed that she perspired very freely on any exertion, and her hands began once more steadily to enlarge; then the feet began to enlarge, and the somnolence and languor increased so much that she finally took to bed, about four years ago. After taking to bed, her thyroid gland began to swell, but the tumour was not very large; the lower jaw later began to enlarge, and the feet also grew larger. After the thyroid began to swell, the tongue became thickened and enlarged, and protruded a good deal between the lips, so that the patient could not articulate distinctly, and partly also lost her sense of taste. Next the lower lip increased in size, and the whole face became very large and swelled in appearance. Her hair also became much coarser and thicker, but she does not think her skin altered. (Her appearance at this stage is given in Plate VIII.) Her intelligence was unimpaired, and she did not become nervous. Her whole body slowly increased in size, the face and lower jaw most markedly so, and she became too weak to leave her bed. She lost the use of her hands, except for writing, which, however, was a great labour. The hands seemed swollen over the dorsum. The heavy sleep at night continued, and even during the day the patient slept a great deal. About a year and a half ago, while reading one day, she happened to close her left eye, when she discovered to her astonishment that the other eye was quite blind. She noticed about the same time that her skin was very pale, especially that of her hands, which was of a "deadly whiteness." She never had any pain, but at times a "heavy feeling" in the head. About this time she suffered from nausea and a giddy feeling when she sat up, but this soon passed off. A year ago, the patient went to the Victoria Hospital, Glasgow, and was under the care of Dr. Napier. She was immediately put upon a course of pituitary and ovarian substance (three tabloids of each daily). She did not feel that this treatment made any difference in her condition, and, after some weeks of it, she was one day leaning over the bed, when she fell down in a fit, without any premonitory symptoms. She was told that she lay in a state of coma for an hour, but was not herself aware of anything that happened. After this fit the pituitary and ovarian glands were stopped, and the patient was put on thyroid gland. While in hospital, it was noticed that she had albuminuria, but there were no kidney symptoms.

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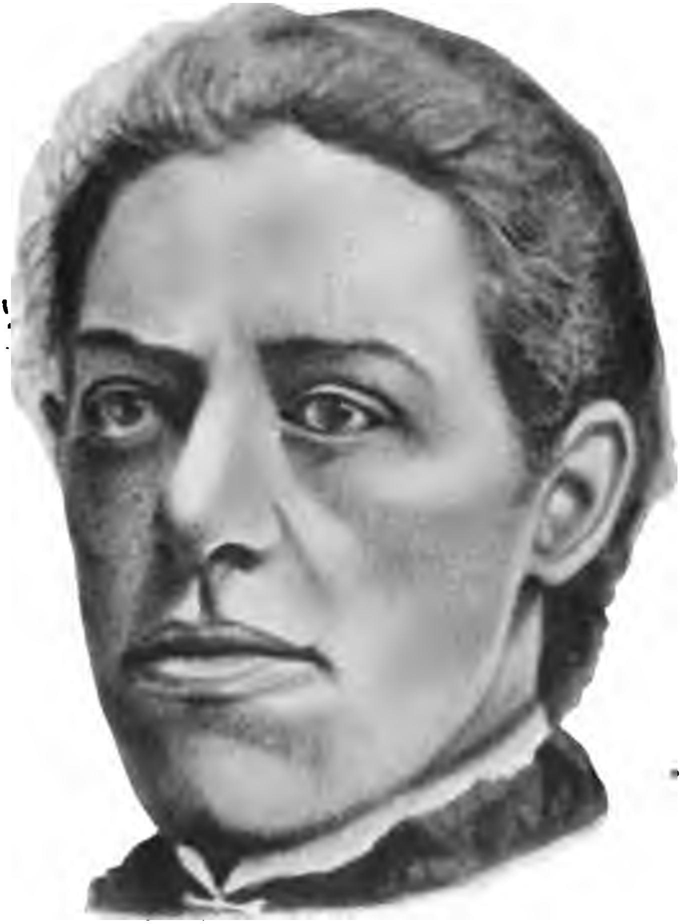
[1] A clinical lecture delivered in the Edinburgh Royal Infirmary.



Acromegaly; appearance soon after the onset of the disease—age 26.

She took a bad cold, and felt very much weaker, and perspired so much that her clothes used to be soaked. After this cold her health steadily improved, and the thyroid became much smaller. The tongue diminished in size, so that she was able to keep it in her mouth. Her weight was also reduced from 9 st. to 7 st. 8 lb. Her sense of taste improved also, and her face became thinner and less heavy. The earlier treatment was again resumed, and, after a stay of three months in the Victoria Hospital, the patient returned home. Her neighbours remarked that her face was "sharper" and less heavy-looking. She had improved so much that she was able to do simple work, such as sewing and knitting, her hands having become smaller and less clumsy. She also did not perspire on the least exertion as she did before the pituitary and ovarian gland treatment. She continued taking two tabloids daily of each gland for about five weeks after her return home, and steadily improved in health. She was able to walk with the aid of a stick, and felt less languid and sleepy. There was no apparent increase in size since her treatment at Glasgow. Her colour improved, and she also slept less heavily.

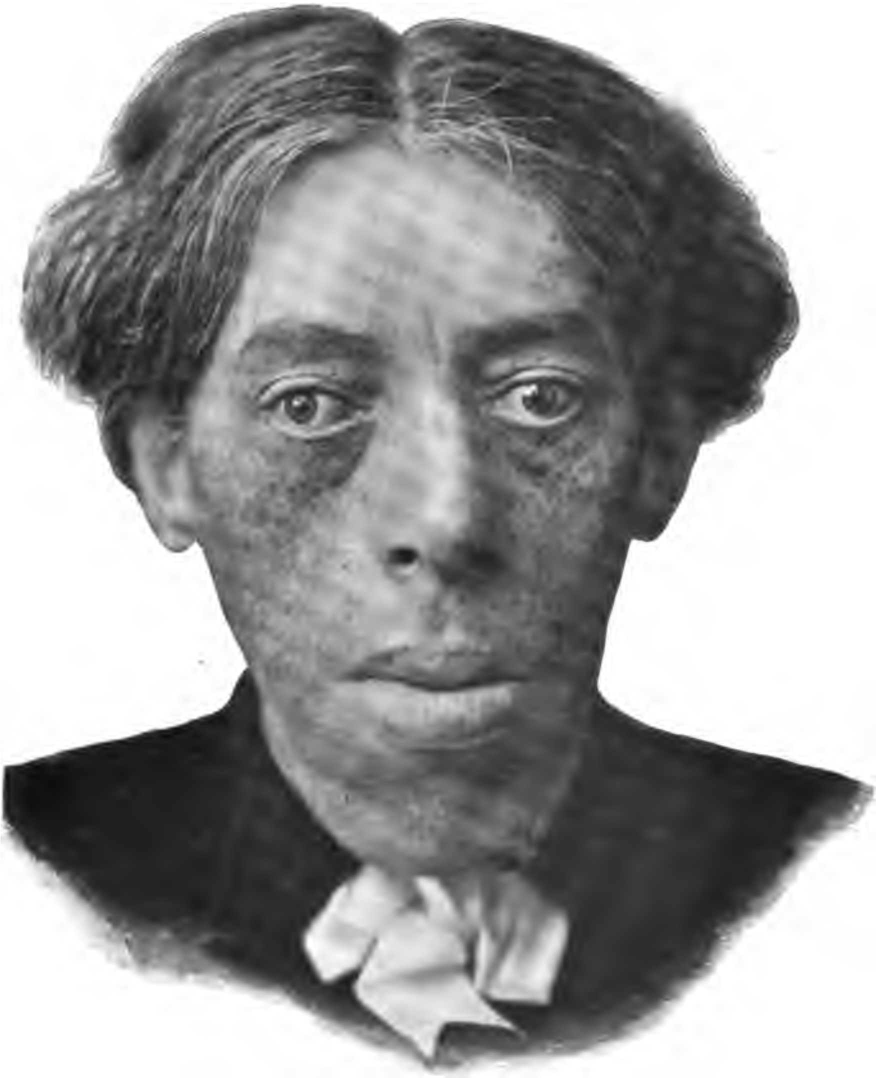
Condition on Admission.—Height, 5 ft. 2 in.; weight, 9 st. 2 lb. The patient was a large, well-nourished woman, with fairly well-developed muscles. She looked rather anæmic, but otherwise healthy. There were no evidences of previous illness or injury except the general enlargement of the body about to be mentioned. She seemed of a happy and contented disposition, and looked intelligent and cheerful. She lay in bed on her right side as a general rule. Temperature subnormal. The head was relatively most enlarged; the feet were next in size; the hands were not so much enlarged; the face was much increased vertically; the lower jaw was especially enlarged, so that the lower part of the face looked broader than the forehead, which was rather peaked, and surrounded by a mass of coarse, wiry hair. The nose was considerably enlarged, and its shape Roman. The lower lip was much thickened, and tended to hang down, showing the lower teeth and tongue. The upper lip was enlarged, but less so. (The appearance of the patient at the time of her admission is given in Plates IX. and X.) The head inclined to fall forwards, and the shoulders were also bent forwards. The spine showed one curve forward. The complexion was fair. The patient was well nourished, but muscularly weak, especially in the lower extremities. The gait was clumsy, and the patient had considerable difficulty in walking. The temperature was always subnormal, 97°-98° F.

Present symptoms.—Patient was very easily fatigued, and suffered from a considerable amount of lassitude. She forced herself to take some exercise, but was not able for much exertion—for a walk of 400 yards, for instance. Before her illness, though not a great walker, she could cover five miles without being tired. At the commencement of her illness, she could only walk one or two miles; she generally came in very tired, and gradually had to give up all outdoor exercise. Sometimes, on first sitting up in the morning, there was nausea and swimming in the head, but no headache at any time. She was sometimes not troubled with this for a month, then another attack came on. Occasionally the nausea ended in vomiting. Two or three times she fainted, apparently without any reason, while sitting quietly, and this was preceded by singing in the ears. The patient was not at all deaf. There was temporal hemianopia of the left, and total blindness of the right eye. The appetite was normal. She suffered from excessive thirst when she had these "turns of nausea." She had no sensation of pains and cramps, but used to feel her hands excessively cold, her feet less so. This coldness was not felt so much about the time of her admission.

DETAILED DESCRIPTION AND MEASUREMENTS. — *Face.* — This was large in proportion to the rest of the body. The expression was intelligent and fairly happy. The colour was pale, and there was pallor of the conjunctival and buccal mucous membranes. The shape of the face was oval, the lower part being larger and heavier. The face had altered very much since the illness began. The *forehead* had not changed very much. It was high and narrow in comparison to the rest of the face, and was rather peaked. The superciliary ridges were enlarged. The *eyebrows* were thick, and the hair was coarse. The *orbital fissures* were wide, and there was some exophthalmos. The *eyelids* were enlarged, but did not quite close over the right eye. The symptom of von Graefe was not present. The *eyelashes* were unchanged. *Eyes.*—They were prominent, and set wider apart than normal. The pupils were equal. There was very slight external strabismus of the right eye. *Nose.*—This was enlarged, straight, and thickened at the tip. The nostrils were enlarged and thickened. *Cheeks.*—These looked rather depressed above, the malar eminences were not prominent, and there was no malar flush. *Mouth.*—The aperture was increased, and the mouth was kept open. *Upper lip.*—This was much enlarged, especially in the centre. *Lower lip.*—It was larger than the upper; it was everted and thick in all its extent. *Jaws.*—The palate was V-shaped, and seemed narrow. The chin was very prominent, and square-shaped. The angle was rounded off, the profile being almost straight. (The skiagram, kindly taken by Dr. Dawson Turner and shown in Plate XI., gives the profile of the upper and lower maxillæ.) There were some coarse hairs on the chin. The jaws made a "mumping" noise on mastication. *Teeth.*—All the upper ones had "crumbled" away, and a few carious stumps were left. The lower incisors were fairly good. The *gums* were enlarged and irregular. *Tongue.*—This was very much enlarged both in length and breadth. It was moist, rather tremulous, not furred, but much fissured in all directions. The papillæ were prominent; the tongue tended to protrude between the lips. The salivary secretion was considerably increased, and dribbled from her mouth when she was asleep. The tonsils and uvula were enlarged. *Head.*—It was of large size, and oval shape; the sutures were not prominent. The *hair* was very dry, coarse, wiry, luxuriant, and of greyish-brown or roan colour.

Measurements of Head and Face.

Circumference of head	59·6 cm.	=	23⅜	in.
Length of head from glabella to occiput	35 ,,	=	13¾	,,
Occipital protuberance to tip of chin	50·6 ,,	=	19⅞	,,
Breadth from mastoid process to mastoid process	34·4 ,,	=	13½	,,
Top of forehead to tip of chin	24·3 ,,	=	9½	,,



Acromegaly; appearance soon after admission—age 42.

Top of forehead to upper part of nasal bones . .	8·2 cm.	=	$3\frac{1}{4}$ in.
Greatest width of alæ nasi	4·7 ,,	=	$1\frac{7}{8}$,,
Length of nose from upper lip to tip . . .	3·4 ,,	=	$1\frac{3}{8}$,,
Length from septum nasi to tip of chin . . .	10·3 ,,	=	$4\frac{1}{16}$,,
Distance between outer surfaces of malar bones .	14 ,,	=	$5\frac{1}{2}$,,
Width of mouth	7 ,,	=	$2\frac{3}{4}$,,
Vertical length of lower lip	6·5 ,,	=	$2\frac{5}{16}$,,
Transverse measurement of lower lip . . .	8 ,,	=	$3\frac{3}{16}$,,
Breadth of tongue at middle	7 ,,	=	$2\frac{3}{4}$,,
Length of tongue on protrusion from lower incisors to tip	5 ,,	=	$1\frac{15}{16}$,,
Vertical measurement of lower jaw from free border of gums to lower part of symphysis	3·3 ,,	=	$1\frac{5}{16}$,,
Length from temporo-maxillary joint to symphysis menti	15·7 ,,	=	$6\frac{3}{16}$,,
Distance between two angles of lower jaw . .	30·9 ,,	=	$12\frac{1}{8}$,,
Greatest length of ears	7·2 ,,	=	$2\frac{7}{8}$,,
Greatest breadth of ears	4·3 ,,	=	$1\frac{3}{4}$,,

Neck.—The neck was short and thick, getting gradually larger at the base, so that it had a sloping aspect. The circumference of the neck between the hyoid bone and the upper border of the thyroid cartilage was 39·5 cm. = $15\frac{9}{16}$ in., and at the level of the thyroid gland, 40 cm. = $15\frac{3}{4}$ in.

Larynx.—This was not large, and the pomum Adami did not look prominent. The hyoid bone was enlarged and prominent.

Length of hyoid	10·5 cm.	=	$4\frac{1}{4}$ in.
Breadth of hyoid vertically in centre . . .	1·5 ,,	=	$\frac{9}{16}$,,

The *voice* was altered in tone, being much lower—almost masculine.

The *articulation* was slow and thick, attended by some difficulty.

Thyroid gland.—The isthmus felt thicker and like a cord, with the lobes on each side slightly enlarged and lobulated.

Thymus gland.—There was dulness over the upper part of the manubrium sterni, extending half an inch beyond each lateral border.

UPPER EXTREMITY.—*Hand and fingers.*—The hand was much enlarged. The former size of glove was $6\frac{1}{4}$, and latterly $7\frac{1}{2}$ was required. Shape, square; enlarged in all dimensions. Shape of fingers, flat antero-posteriorly, enlarged most at the joints. The terminal phalanges tended to be pointed, and they were slightly flexed. The *nails* were square, flat, enlarged, and grooved longitudinally, and inclined to stand out from the fingers. The *bones* were enlarged, and there were nodes on most of the phalangeal joints. *Muscles.*—The hypothenar and thenar eminences on both sides were atrophied; the interossei and other muscles were also atrophied, but less markedly. *Soft parts.*—The palm was covered with a thick pad of fat, and the furrows were deep and well marked. (The appearance of the hands is shown in Plate XII.)

The *wrist* was enlarged. The lower end of the radius and ulna were increased. The movements of the joint were unimpaired. There was no creaking or effusion.

Forearm.—The patient stated that the forearm and upper arm were not enlarged, and that she always had rather a prominent elbow-joint. The muscles felt flabby and poorly developed. The joint was normal.

Clavicles and scapulæ.—These were enlarged, especially the clavicles. The muscles were poorly developed. The deltoid was especially much atrophied.

Shoulder-joint.—The head of the humerus was slightly increased, but more because of the prominence of the glenoid fossa. The joint moved freely.

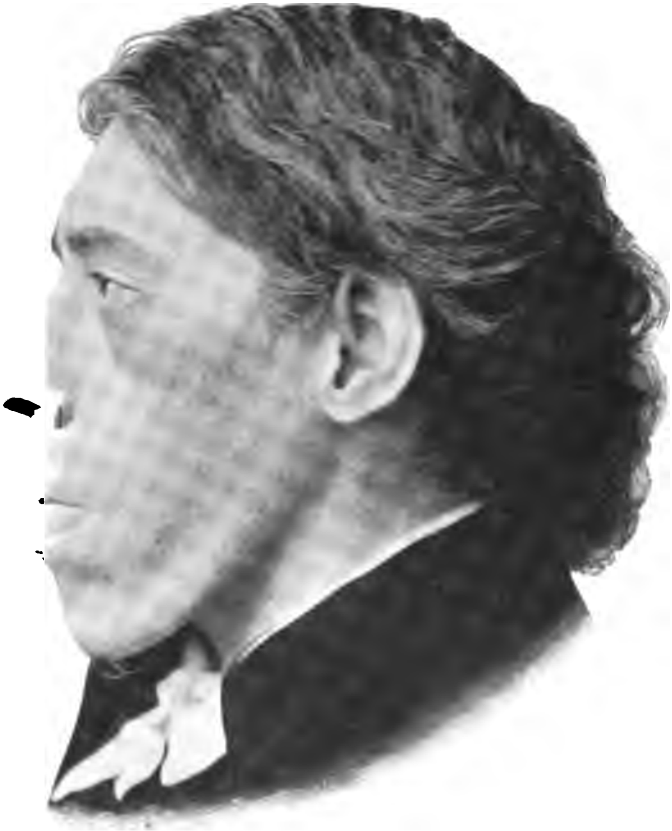
Measurements of Upper Extremity.

Length of arm from acromion process to olecranon	R.	36·5	cm.	=14⅜	in.
	L.	35	,,	=13⅞	,,
Circumference of arm at its middle	R.	24	,,	= $9\frac{7}{16}$	,,
	L.	24	,,	= $9\frac{7}{16}$	,,
Length of forearm from olecranon to styloid process of ulna	R.	20·5	,,	= $8\frac{1}{16}$	,,
	L.	17·5	,,	= 6⅞	,,
Circumference of forearm at middle	R.	18	,,	= $7\frac{1}{16}$	,,
	L.	16·5	,,	= 6½	,,
Circumference of wrist	R.	17·5	,,	= 6⅞	,,
	L.	17·5	,,	= 6⅞	,,
Length of middle finger from palmar fold to tip	R.	11	,,	= $4\frac{5}{16}$	,,
	L.	11	,,	= $4\frac{5}{16}$	,,
Circumference of little finger	R.	5·5	,,	= 2⅛	,,
	L.	4·5	,,	= 1¾	,,
Length of middle finger on dorsum from metacarpo-phalangeal joint to tip	R.	10·5	,,	= 4¼	,,
	L.	10·5	,,	= 4¼	,,
Length of little finger on palmar aspect	R.	5·5	,,	= $2\frac{3}{16}$	,,
	L.	5	,,	= 2	,,
Length of thumb on dorsum from metacarpo-phalangeal joint to tip	R.	9·5	,,	= 3¾	,,
	L.	9·5	,,	= 3¾	,,
Circumference of thumb	R.	8·5	,,	= $3\frac{5}{16}$	,,
	L.	8·2	,,	= 3¼	,,
Antero-posterior diameter of middle finger	R.	2·4	,,	= $\frac{15}{16}$	,,
	L.	2	,,	= ¾	,,
Lateral diameter of middle finger	R.	1	,,	= ⅜	,,
	L.	1·4	,,	= $\frac{9}{16}$	,,
Length of nail of middle finger	R.	1·4	,,	= $\frac{9}{16}$	,,
	L.	1·3	,,	= ½	,,
Breadth of nail of middle finger	R.	1·5	,,	= $\frac{9}{16}$	,,
	L.	1·5	,,	= $\frac{9}{16}$	,,
Length of nail of thumb	R.	1·3	,,	= ½	,,
	L.	1·3	,,	= ½	,,
Breadth of nail of thumb	R.	2	,,	= ¾	,,
	L.	2	,,	= ¾	,,
Circumference of hand without thumb	R.	21	,,	= 8¼	,,
	L.	18·5	,,	= 7¼	,,
Circumference of hand with thumb, obstetrical position	R.	23½	,,	= 9¼	,,
	L.	22	,,	= 8⅝	,,
Breadth of hand at metacarpo-phalangeal joints	R.	10·5	,,	= 4⅛	,,
	L.	9	,,	= $3\frac{9}{16}$	,,

TRUNK.—The *thorax* looked flattened, and increased transversely.

The *sternum* was large, and rather flat, with a very slight curve; it felt thick and broad.

The *ensiform cartilage* could be felt larger and less cartilaginous than normal, but still flexible.



Acromegaly ; appearance soon after admission—age 42.

The *ribs* were increased vertically, so that the intercostal spaces are very much diminished. The cartilages were not increased in proportion to the ribs, and seemed to be partly ossified. No nodes could be felt, except on first and second ribs.

The *mammæ* were small, and the areolæ pale; there were no hairs.

Abdomen.—This was fairly plump and not pendulous; it presented no striæ. The mons veneris was fairly prominent. The pubic hair was abundant and coarse.

Pelvis.—This had very roomy, broad ilia. The bones seemed massive and thickened. The interspinous processes were $10\frac{1}{2}$ in. apart.

External genitals.—The patient stated that there had not been any change. Menstruation had been completely arrested, with the exception of one occasion (two years after her illness began) since its commencement.

Spinal column.—The spinous processes could scarcely be palpated, except in the lumbar region; kyphosis was present.

Measurements of Trunk.

THORAX AND ABDOMEN.				
Circumference of neck between hyoid bone and thyroid cartilage at superior border		38	cm.	= $14\frac{15}{16}$ in.
Circumference of chest on a level with the mammæ		88	,,	= $34\frac{11}{16}$,,
Antero-posterior diameter of chest		31	,,	= $12\frac{3}{16}$,,
Lateral diameter of chest		13·5	,,	= $5\frac{5}{16}$,,
Circumference of body on a level with umbilicus		82	,,	= $32\frac{5}{16}$,,
Circumference of pelvis on level with antero-superior spines of ilia		87·5	,,	= $34\frac{7}{16}$,,
STERNUM.				
From episternal notch to base of xiphi-sternum		19	,,	= $7\frac{1}{2}$,,
Transverse measurement at second costal cartilage		8	,,	= $3\frac{1}{8}$,,
CLAVICLE.				
From sterno-clavicular joint to acromio-clavicular joint	R.	16·5	,,	= $6\frac{1}{2}$,,
	L.	16·5	,,	= $6\frac{1}{2}$,,
Acromial end of clavicle	R.	2·8	,,	= $1\frac{1}{16}$,,
	L.	3	,,	= $1\frac{3}{16}$,,
SCAPULÆ.				
Vertical measurement from superior angle to inferior angle	R.	20	,,	= $7\frac{7}{8}$,,
	L.	20	,,	= $7\frac{7}{8}$,,
From vertebral border opposite spine of scapulæ to tip of shoulder	R.	14·8	,,	= $5\frac{13}{16}$,,
	L.	14·8	,,	= $5\frac{13}{16}$,,
RIBS AND SPACES.				
Average width is		2·5	,,	= 1 ,,
Average width of intercostal spaces		·5	,,	= $\frac{3}{8}$,,

DESCRIPTION OF THE STERNUM.—The second and third ribs had nodes on them, and seemed to replace the costal cartilages, these nodes being especially marked on the right side. There was a ridge at the junction of the manubrium and gladiolus. The *intercostal spaces* were almost filled up, the ribs being much enlarged both in length and width. The angle of the ribs was much rounded off. The acromial process of the scapula was enlarged, and the acromial end of the clavicle much increased, forming a projecting node. The upper end of the sternum and the sternal ends of the clavicles encroached very much on the root of the neck.

LOWER EXTREMITIES.—The whole foot was enlarged; the former size of boots being 3, and that on admission 7.

Shape.—The foot was very broad, flat, and, though enlarged in all dimensions, the greatest increase was in width. All the toes were enlarged, especially the large and little toes. The last phalanx was broadened, and the whole toe was much thickened antero-posteriorly, due to the thick pad of fat covering the sole of the terminal phalanx. The *nails* were relatively small, and tended to be flat below and curved back above. They were embedded in the soft tissues below and at the sides, and were grooved longitudinally. The *bones* of the foot were all enlarged, but especially the phalanges and tarsals. The *muscles* over the dorsum were slightly atrophied, but there were very thick pads of fat all over the sole, which were especially thick over the metatarso-phalangeal joint and last phalanx. The *furrows* on the sole were deep and well marked. (The aspect of the feet is shown in Plate XIII.)

Ankle-joint.—The malleoli and astragalus were considerably enlarged, the os calcis less so. There was no abnormality about the movements of the joint.

Leg.—Except at the extremities, the leg bones were not enlarged. The muscles were poorly developed, and rather soft. There was little subcutaneous fat.

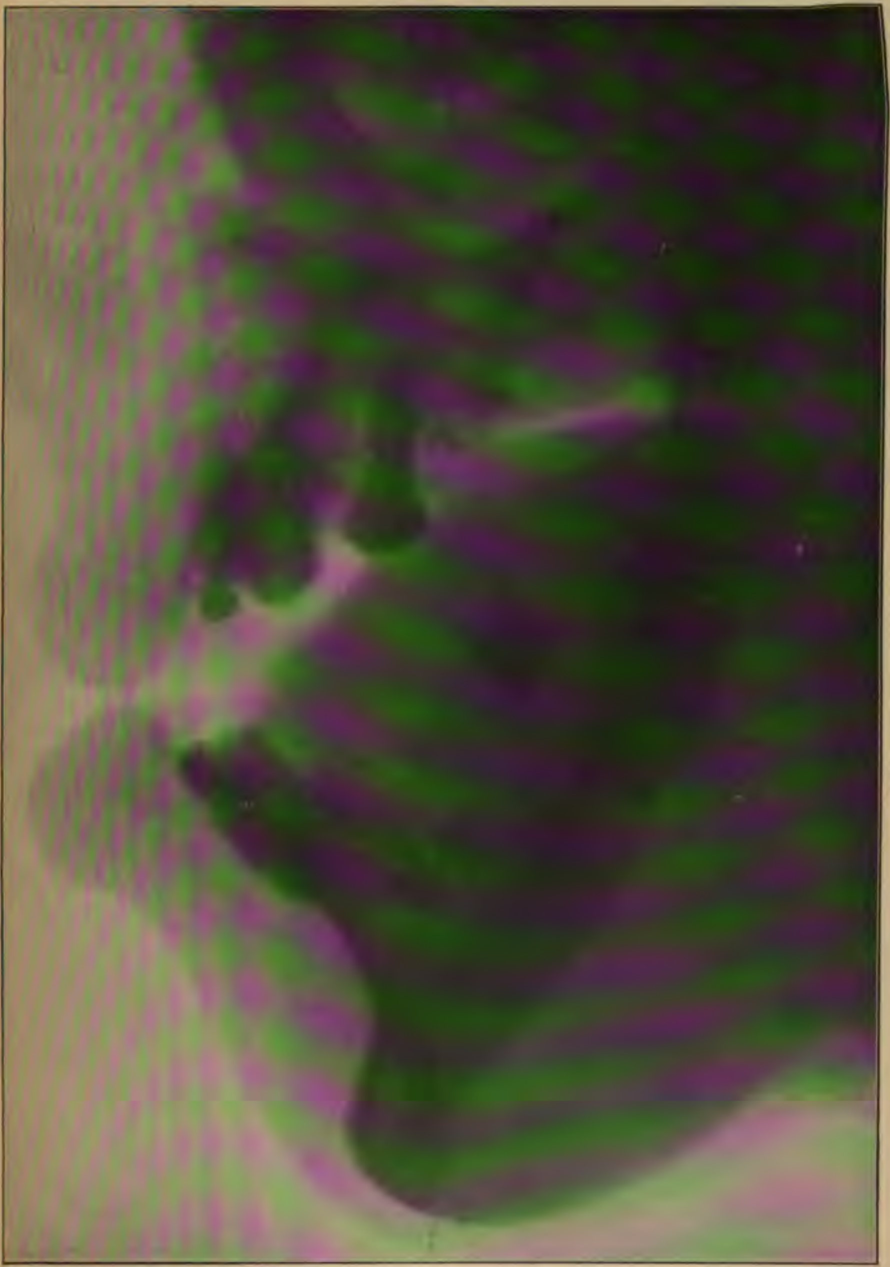
The *knee-joint* was considerably enlarged. The internal tuberosity of the tibia looked most enlarged. The tubercles of the tibia on each side, and the head of the fibula were enlarged. The patella seemed large relatively. There was some grating on moving both joints.

Thigh.—The bone was not enlarged. The muscles were soft and poorly developed; the buttocks flattened and atrophied.

Hip-joint.—There was some creaking on movement in the right hip-joint. The iliac bones were somewhat more massive than normal, especially the crests, which were also thickened. The bone round the acetabulum was also thickened. The great trochanters did not seem to be enlarged.

Detailed Measurements of Lower Extremity.

Length of thigh from iliac crest to head of fibula	R. 52·5	cm.	=20½⅛ in.
	L. 51·4	,,	=20¼ ,,
Circumference of thigh at middle . . .	R. 39·8	,,	=15⅝ ,,
	L. 38	,,	=14½⅜ ,,
Circumference of knee round patella . . .	R. 35	,,	=13¾ ,,
	L. 33·6	,,	=13¼ ,,
Vertical diameter of patella	R. 7·5	,,	= 2½⅜ ,,
	L. 7	,,	= 2¾ ,,
Transverse diameter of patella	R. 7·6	,,	= 3 ,,
	L. 8	,,	= 3⅛ ,,
Length of leg from head of fibula . . .	R. 38	,,	=14½⅜ ,,
	L. 38	,,	=14½⅜ ,,



Acromegaly; radiograph of jaws in profile.

Greatest circumference of calf	R.	27·4	cm.	= $10\frac{3}{4}$	in.
	L.	27·4	,,	= $10\frac{3}{4}$	,,
Circumference of ankle just above tip of internal malleolus	R.	25·5	,,	= $10\frac{1}{16}$	,,
	L.	24	,,	= $9\frac{7}{16}$	,,
Greatest length of foot	R.	22·7	,,	= $8\frac{15}{16}$	,,
	L.	21·5	,,	= $8\frac{7}{16}$	,,
Circumference over heel and instep	R.	32·6	,,	= $12\frac{13}{16}$	,,
	L.	32·6	,,	= $12\frac{13}{16}$	,,
Circumference of foot over back of toes	R.	22·9	,,	= 9	,,
	L.	22·9	,,	= 9	,,
Greatest width of foot	R.	27	,,	= $10\frac{5}{8}$	,,
	L.	27	,,	= $10\frac{5}{8}$	,,
Circumference of great toe	R.	10	,,	= $3\frac{15}{16}$	,,
	L.	10	,,	= $3\frac{15}{16}$	,,
Circumference of middle toe	R.	5	,,	= 2	,,
	L.	5	,,	= 2	,,
Circumference of little toe	R.	7·2	,,	= $2\frac{13}{16}$	,,
	L.	7	,,	= $2\frac{3}{4}$	,,
Length of nail of great toe	R.	1	,,	= $\frac{3}{8}$	,,
	L.	·9	,,	= $\frac{5}{16}$	,,
Breadth of nail of great toe	R.	1·8	,,	= $\frac{11}{16}$	,,
	L.	2·1	,,	= $\frac{13}{16}$	,,
Length of great toe from proximal joint to tip	R.	6	,,	= $2\frac{3}{8}$	,,
	L.	5·8	,,	= $2\frac{1}{4}$	,,
Length of second toe from proximal joint to tip	R.	5·5	,,	= $2\frac{1}{8}$	,,
	L.	5	,,	= 2	,,

Alimentary System.—The lips were pale, thick, flabby, and the lower one was everted. In the upper jaw there were only a few carious teeth; in the lower, the central incisors were fairly good. The gums were pale and rather irregular in shape. The tongue was very large and thick, with numerous fissures, but moist and clean. It was protruded in a straight line, but trembled slightly on protrusion.

Secretions of mouth.—There was a copious secretion of saliva, which dribbled away during sleep. The *fauces* were swollen. The *palate* was V-shaped, and rather narrow. There were no subjective phenomena, except occasional attacks of thirst. The bowels tended to be constipated. The stomach and liver were not enlarged.

Hæmopoietic System.—The buccal and conjunctival mucous membrane were pale. The face was colourless. The blood showed 75 per cent. of hæmoglobin and 4,300,000 red blood corpuscles, some of which were crenated and shrunken.

Thyroid gland.—The patient stated that the gland had been considerably enlarged formerly, but that latterly it had almost disappeared, perhaps from the course of thyroid feeding. The isthmus was felt almost like a cord, and the two lobes could be felt slightly enlarged. The circumference of the neck over the thyroid was 40 cms., *i.e.* $15\frac{3}{4}$ in. The spleen was not enlarged, and there was no evidence of other enlarged glands.

Circulatory System.—There were no subjective phenomena.

Pulse.—This was felt with difficulty. The rate was 80 per minute. The rhythm was regular in time, but sometimes there was a stronger beat, followed by a weaker. The arterial walls were healthy.

Heart.—The apex beat was seen to be in the fifth interspace, $4\frac{1}{2}$ in. from midsternum. It was felt with difficulty on account of the large size of the ribs, and no pulsation over the præcordia could be made out. The upper border was situated in the second interspace, and the right border was 1½ in. from the right margin of the sternum. The heart sounds were faint in all the areas. In the aortic area there was a slightly accentuated second sound; the other areas had normal sounds, though the pulmonary second sound was sometimes reduplicated.

RESPIRATORY SYSTEM.—There were no subjective phenomena. Respirations, 16 per minute. Patient breathed heavily, and the breathing tended to be puerile. Physical examination revealed no abnormality.

INTEGUMENTARY SYSTEM.—There were no subjective phenomena. In the sunshine, or before a very hot fire, a rash came out on the back of the hands, which itched a great deal. The rash lasted a few days, and then disappeared. The colour was pale, and the texture soft and smooth, but rather thick. There were marked furrows on the palms of the hands and the soles of the feet. The skin was not more wrinkled than might be expected in a woman of her age. It was inclined to be moist. The patient was easily heated, and then perspired freely. There was a brown patchy eruption over some parts of the body. The patient was well nourished, but not obese. There were three warts on the neck, and warts on both extremities, but the patient thought they may have been there before her illness.

URINARY SYSTEM.—About a year before admission, the patient was troubled with slight incontinence of urine, which continued for some months, but she had no further trouble in this respect. She never had any other subjective symptoms.

Urine.—Quantity, average 30 oz.; colour, amber; specific gravity, 1020; reaction, acid. Abnormal constituents—albumin, no blood, no bile, no sugar, no phosphates, no deposit except mucus. The estimation of albumin and urea for several days is given in the following table:—

Daily Estimation of Albumin.

Feb. 24	·35 gr. per oz.	Mar. 2	·7 gr. per oz.
,, 25	·43 ,, ,,	,, 3	·7 ,, ,,
,, 26	·43 ,, ,,	,, 4	·52 ,, ,,
,, 27	·43 ,, ,,	,, 7	·52 ,, ,,
Mar. 1	·7 ,, ,,	May 10	·32 ,, ,,

Daily Estimation of Urea.

Feb. 25	4·5 gr. per oz.	Mar. 3	6·5 gr. per oz.
,, 26	1 ,, ,,	,, 4	6 ,, ,,
,, 27	4·5 ,, ,,	,, 7	5 ,, ,,
Mar. 1	2·4 ,, ,,	,, 8	8·5 ,, ,,
,, 2	6·5 ,, ,,	May 10	5 ,, ,,

REPRODUCTIVE SYSTEM.—The catamenia began at the age of 14, and the periods were for six years always regular, with no dysmenorrhœa. About 20, the patient began to be troubled with attacks of fainting just before or after her periods. She consulted a doctor, who gave her some medicine, and the seizures stopped after a few months. After her illness began, the catamenia stopped altogether, and appeared once only, about twelve years ago.

NERVOUS SYSTEM.—*Sensory functions.*—There were no abnormal sensations, except that the hands often felt very cold. Ordinary sensibility to touch, pains, heat, cold, and electric stimuli was intact.

SIGHT.—The *right eye* was blind, except to slight perception between light and darkness. The *left eye* showed temporal hemianopia. The *pupils* were equal, and the margins regular. The left eye contracted to light and accommodation. When the left eye converged, the right eye diverged, and *vice versâ*. The external strabismus has been already noted. *Ophthalmoscopic examination* showed advanced optic atrophy in the right eye, and a similar change in the nasal half of the left disc. The *sense of smell* was unimpaired, but the *sense of taste* was not very acute. She required a strong stimulus, and stated that food must be highly seasoned before she could taste it. *Hearing* was rather more acute on the right side. Bone conduction on both sides was normal. The muscular sense was normal.

MOTOR PHENOMENA. — The organic reflexes were normal. The cutaneous reflexes were intact save for some increase of the plantar reflex. The knee-jerk on the left side was exaggerated, but no clonus of knee or ankle was present. Voluntary movements perfect, and no interference with co-ordination. The *vasomotor* and *visceral* functions were intact.

INTELLECTUAL FACULTIES.—The patient was very intelligent and good-tempered. She thought her memory was not quite so good as it had been. She stated that it had been very sharp formerly.

SLEEP.—She was often somewhat drowsy during the day, and slept long and heavily each night—about twelve hours.

LOCOMOTORY CONDITION.—The patient walked with difficulty, but this seemed to be more due to muscular weakness, and to the enlargement of many of the joints. The patient could only stoop down and rise up with great difficulty.

The diagnosis in this very interesting case could not for a moment be in doubt, as every feature pointed with absolute clearness to acromegaly. Certain aspects of the disease might, at particular stages, have led to some uncertainty, but the entire group of symptoms could not be mistaken. Before making any remarks on the diagnosis of the disease in general, it will be convenient to consider some of the facts as regards clinical features and pathological results.

Since the appearance of Marie's famous paper,[1] in 1886, a very large number of contributions have been published on, and many additions have been made to our knowledge of, acromegaly. It is no part of my present intention to attempt any review of the literature, which is fully given in the works of Souza-Leite[2] and Sternberg.[3] My aim is briefly to analyse the symptoms of acromegaly in general, in order to ascertain in what respects the patient whom you have seen differs from what may be termed the type of the disease.

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[1] Marie, *Rev. de méd.*, Paris, 1886.

[2] "Thèse de Paris," 1890.

[3] Nothnagel's "Specielle Pathologie und Therapie," 1897, Bd. vii.

The external appearances in acromegaly are sufficiently characteristic, and include alterations in form, due to modifications in the bones, with changes in the skin, hair, and subcutaneous tissues, as well as in some of the internal organs. Commencing our analysis with the head and face, we find that the enlargement, in almost all cases on record, affects the latter more than the former, and, while the nose and upper jaw undergo considerable increase in size, the lower jaw is the part which is most affected. The inferior maxilla is not only greatly increased in size, it is also altered in form. The change in shape consists in an obliteration to a greater or lesser extent of the angle of the lower jaw. In all respects our present patient conforms to the usual type of the disease, and the profile photograph as well as the skiagram of the bones of the face brings out most remarkably the change in the lower jaw.

The soft tissues about the face are also often greatly modified, and the most characteristic changes may be traced in the patient you have just seen. The hair is not only largely increased in quantity, but the individual hairs are much thickened. The ears are enlarged. The nose, the mouth, and the tongue have all undergone a considerable increase in size.

The upper extremity has enlarged throughout. The collar-bones and shoulder-blades are increased on both sides, and the bones of the arm and forearm are likewise enlarged. The enlargement of the bones of the hands does not conform to the usual type of the disease, inasmuch as the increase has taken place in such a fashion as to render the ends of the metacarpal bones and phalanges irregularly enlarged.[1] It is no wonder, in an early condition of the disease, that the patient was assumed to suffer from arthritis deformans. The result of this tendency is, that instead of the fingers resembling sausages, as Marie mentioned, they are more knobby and irregular. While the general condition of the muscles of the upper extremity is good, there is some atrophy of certain of the muscles of the hands, especially of the thenar, hypothenar, and interosseous group, such as has been described by Mosse[2] and Comini.[3]

The lower extremity in our patient presents features analogous to those exhibited by the upper extremity, in respect of the integrity of the muscular system as a whole, with some atrophy in the muscles of the feet. In both superior and inferior extremities there must finally be mentioned the presence of pads about the wrist and ankle, giving a sensation to the observer not unlike that of myxœdema.

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[1] Skiagrams of the hands and feet were shown at the lecture, but as the appearances have been published on several occasions by previous writers, it is unnecessary to reproduce them.

[2] *Compt. rend. Soc. de biol.*, Paris, 1895.

[3] *Arch. per le sc. med.*, Torino, 1896.

One very interesting feature in our case is a want of symmetry between the extremities of the two sides, the right being larger than the left, especially as regards the upper extremity. As the eye changes are more marked on the right side, we may assume that the pituitary body is more increased on that side, and there may be some causal nexus between this and the size of the extremities.

The body very commonly becomes large and clumsy, and our case forms no exception to this general rule. It has already been remarked that the bones of the shoulder girdle are considerably increased, and the sternum as well as all the ribs have undergone much enlargement, while the vertebral column manifests well-marked kyphosis, as has been described by Broca,[1] without any compensatory lordosis in its lower part, which Sternberg[2] states to be common. In regard to the muscles and subcutaneous textures of the body, a few inconsiderable changes are to be observed, but these need not detain us.

The alterations in the mouth have already been referred to, yet as regards the alimentary system there is absolutely no other alteration. The hæmopoietic system has some changes, such as have been commonly described. The blood itself shows the presence of 75 per cent. of hæmoglobin and 4,300,000 red blood corpuscles, a few of which are slightly altered in shape. None of the lymphatic glands are large, and the spleen is of the usual size. The thyroid gland used to be considerably enlarged. This enlargement has been observed in a very large number of cases previously recorded; and in a case mentioned by Mendel[3] the enlargement of the gland preceded the development of symptoms of acromegaly by several years. The gland has often been described as undergoing an increase followed by a decrease; this has been the case in our patient; but an interesting subject for remark is her opinion that the disappearance of the enlargement followed upon the administration of thyroid extract. It is difficult to be certain in our case as to the size of the thymus gland. Erb[4] considered that an increased dulness in the region of the manubrium sterni was due to a large thymus, but at the post-mortem examination of his case, Arnold[5] found very slight increase in the size of the gland. The increased dulness, indeed, is said by Mosler[6] to be a late symptom of the disease, and to have its origin in the greater thickness of the sternum.

Many complications connected with the circulation have been described, but the only condition occurring with any constancy is an enlargement of the heart, such as is present in our own case.

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[1] *Arch. gén. de méd.*, Paris, 1888.

[2] *Op. cit.*

[3] *Berl. klin. Wchnschr.*, 1895.

[4] *Deutsches Arch. f. klin. Med.*, Leipzig, Bd. xlii.; and *München. med. Wchnschr.*, 1894.

[5] *Beitr. z. path. Anat. u. z. allg. Path.*, Jena, 1891; and *Virchow's Archiv*, Bd. cxxxv.

[6] *Deutsche med. Wchnschr.*, Leipzig, 1891.

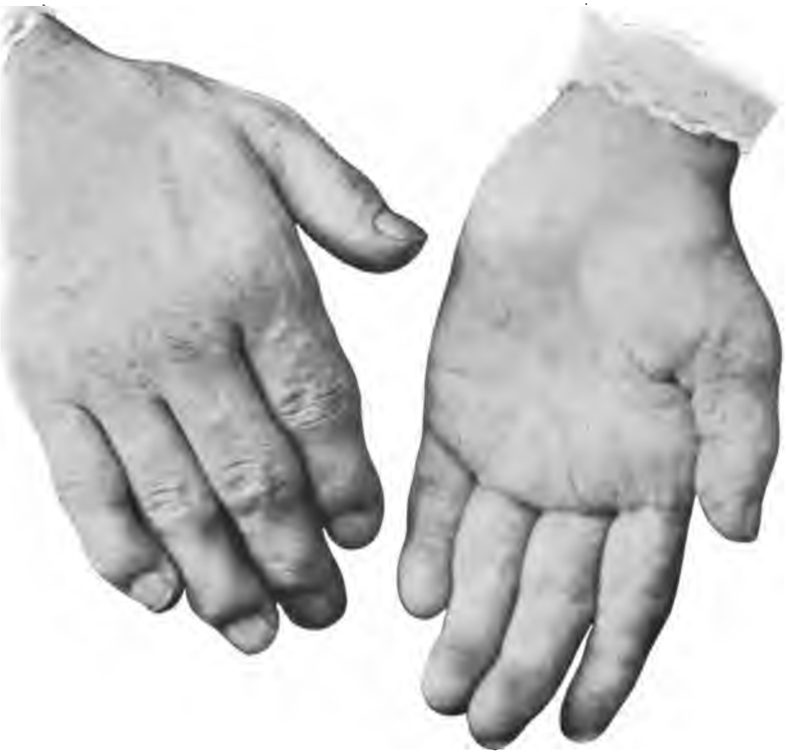
The respiratory system has been previously described as manifesting many changes, but there is no constancy amongst them, and in our own case there is a total absence of any abnormal phenomena. The skin and subcutaneous textures have been dealt with in considering the general appearances, and the only point that need be referred to in this place is, that our patient has a considerable increase in its moisture. As regards the urinary system, it is to be observed that, as so commonly happens, albuminuria is present, but glycosuria—which is even more frequently observed—has, in our case, never been detected. The reproductive system shows, as in most recorded instances, profound disturbance.

The patient has no interference with ordinary sensibility, either as regards subjective or objective facts. There is an utter absence of the acroparæsthesia so often mentioned, as well as of the anæsthesias and hyperæsthesias likewise placed on record. As regards the special senses, the condition of the eyes closely conforms to what has often been described. There is total blindness of the right, and temporal hemianopia of the left eye: while, on ophthalmoscopic examination, there is atrophy of the optic nerve in the right eye, and of the nasal side of the left disc. It is obvious that the condition has commenced as bi-temporal hemianópia, progressing towards the present condition. The sense of hearing is but little affected, and it may be remarked that, although alterations in the auditory sense have been described, there is but little known on the subject. The sense of smell is unimpaired, but the sense of taste, as has often been previously mentioned, is somewhat diminished. Turning to the reflex phenomena, we have seen that, while the organic reflexes are unimpaired, the cutaneous reflexes are slightly exaggerated. The tendon responses are practically normal, but the left knee-jerk is slightly more evident than the right. The muscular sense shows no abnormality. There is some weakness of the muscles, as has been commonly observed, but there is no interference with the co-ordination of movement. Electric reactions are within normal limits, as has usually been the case in previously recorded instances.

The etiology of the disease will not detain us long, as facts alone need be mentioned.

It is almost equally common in men and women—of 210 recorded cases, 104 occurred in men and 106 in women. The affection usually begins in the third decade. Sternberg has analysed fifty-five male and seventy female cases, with the following result:—

Under 20	years,	8	males	= 14·6	p.c.	and	10	females	= 14·3 p.c.
„ 21–30	„	30	„	= 54·5	„	„	35	„	= 50·0 „
„ 21–40	„	14	„	- 25·4	„	„	18	„	= 25·7 „
Above 40	„	3	„	= 5·5	„	„	7	„	= 10·0 „



Acromegaly; appearance of hands.

Heredity plays a doubtful part, in spite of the observations of Bonardi[1] and Schwoner,[2] in which a possibility of inheritance must be allowed. Previous diseases, as typhoid fever, scarlet fever, syphilis, and other infections, as well as acute and chronic diseases of different systems, have often been regarded as having a determining influence. Chemical poisons, such as alcohol and lead, have also been assigned as causes. But physical and mental shocks seem to have been the most common antecedents of the disease. It is possible that the relation has in many instances been more an accidental association than an etiological connection, nevertheless there is probably some true causal nexus in a proportion of such instances.

Such are the facts bearing on etiology. It would be interesting if we had time to dwell for a short space upon the theories that have been advanced—pituitary, thymus, nervous, and atavistic —to account for the disease; but these may be studied in Sternberg's work.[3]

The morbid anatomy of the affection shows many changes, such as might be expected from the clinical phenomena. In the bones the most constant changes are thickening of the periosteum, and widening of the spaces for the bone marrow; but the condition of the osseous texture presents no characteristic alterations. It almost appears, as Sternberg says, as if every author had tried to make out conditious which he has found as typical of the affection. The cartilages and the joints show thickenings, with modifications in the condition of the cells. The muscles, on the other hand, are more commonly found to be atrophic, with degeneration of the fibres and increase of the intermuscular tissue. The internal organs, for the most part, are enlarged; and this increase in size may affect every organ of the body. In all previous descriptions there has usually been enlargement of the liver and other organs connected with digestion. The lymphatic glands, the tonsils, the thyroid, the thymus, and the spleen are very commonly also found to be increased; but the most remarkable change is that which is undergone by the pituitary body. The structure of this organ is extremely complicated, as shown by Andriezen,[4] seeing that it is partly composed of nervous tissue, and partly of the remnants of a water vascular system, as well as of a true secreting glandular organ. The changes which it undergoes are sometimes simple hypertrophy, with or without sclerotic processes. Hæmorrhages into the gland have been observed, and it also undergoes colloid degeneration. A cystic condition has been described by Boyce and Beadles,[5] which is regarded by

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[1] *Riv. clin.*, Milano, 1893.

[2] *Ztschr. f. klin. Med.*, Berlin, Bd. xxxii. Suppl.

[3] *Op. cit.*

[4] *Brit. Med. Journ.*, London, 1894, vol. i.

[5] *Journ. Path. and Bacteriol.*, Edin. and London, 1893, vol. i. p. 223.

Sternberg[1] as the result of colloid degeneration. Other changes, resembling glioma and sarcoma, have also been described. The heart is almost invariably hypertrophied; it has only once been found atrophic, by Henrot.[2]

From the point of view of diagnosis, there is but little to discuss. In its early conditions the disease might possibly be taken for cerebral tumour, if the effects upon the eyes and the nervous system attracted attention; and in the same way the alterations in the hands, due to wasting of the muscles, which often precede the other symptoms of the disease, may lead to the diagnosis of progressive muscular atrophy. Similarly, in an early condition, it is possible that the disease might be mistaken for myxœdema. Such mistakes can never take place when the affection is fully developed. Arthritis deformans, with its alterations in the bones and joints, more especially the changes in the hands and feet, along with kyphosis, may give in some respects a resemblance to acromegaly, but the absence of changes in the face is sufficient to establish a differential diagnosis. In osteitis deformans the alterations are found in the shafts of the long bones, and in the bones of the cranium, while the facial bones escape. In the affection known as hypertrophic pulmonary osteo-arthropathy, there is enlargement of the hands and feet as well as of the ends of the long bones, more particularly of the forearm and legs; but in this chronic disease the bones of the face and skull are not involved. The singular affection called leontiasis ossea presents hyperostosis of the cranium as well as of the face in some instances. In this curious disease, however, there is no affection of the extremities. And finally, in simple gigantism, the enlargement is symmetrical, and does not produce the want of proportion so strikingly characteristic of acromegaly. It must nevertheless be borne in mind that no distinct line can be drawn between simple gigantism and that which is attended by acromegaly. In both there has been found great enlargement of the pituitary body, or, in skeletons of giants of former times, of the sella turcica; and there have not been wanting authors to suggest that acromegaly and gigantism are but one affection in different degrees.

It is difficult to say anything very definite as regards prognosis, but it may be stated that the majority of previously recorded instances have pursued a lengthy course, and have terminated in a progressive asthenia, or by means of some intercurrent affection.

As regards treatment, it is natural in this epoch to seek some method resting on an etiological basis. This has been attempted in two directions: in the first place, by the removal of the pituitary body; and, in the next, by the administration of an extract of that body. The one line of practice is obviously dictated by the belief

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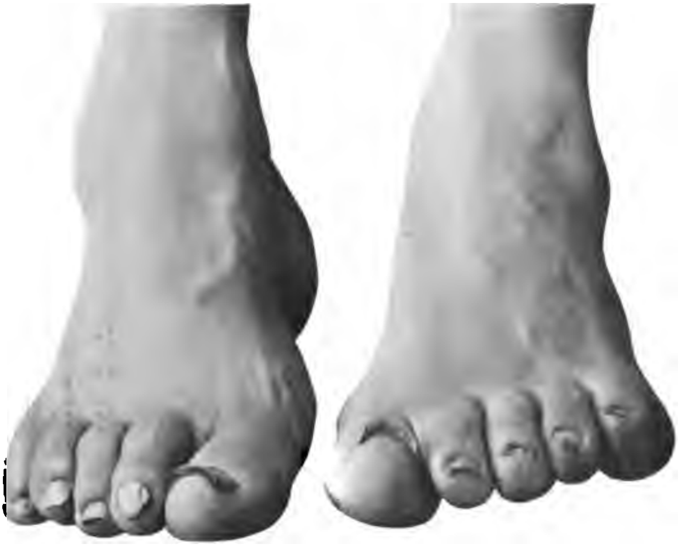
[1] *Op. cit.*

[2] "Notes de clinique médicale," Rheims, 1877 and 1882.



Acromegaly; appearance of feet.

that the presence of a hypertrophied pituitary body is the chief factor in the production of the disease; while the other is just as clearly based upon the conception that, although enlarged, the pituitary body is not pouring into the blood its proper secretion. It cannot be said that the employment of either of these methods has proved of the slightest benefit. In fact, the results of operation upon the pituitary body, as in the case narrated by Caton and Paul,[1] have up to the present time been attended by fatal results; and although transitory improvement has followed the use of pituitary preparations, first employed by Mendel[2] and Marinesco,[3] the results are inconstant and usually disappointing. The use of thyroid extract, advocated by Bramwell[4] and Putnam,[5] has frequently produced some improvement; but, on the other hand, injurious results have been described. When it is considered that remissions take place in the course of most cases of acromegaly, we are apt to be somewhat doubtful as to the results which are recorded. It need hardly be added, that the support of the patient by every available means, and the treatment of any disturbing symptom, must be followed.

In our case the employment of thyroid tabloids seems to have caused considerable improvement, and this was accompanied by a steady loss of weight, as follows:—

March	21	. . .	weight	9 st.	1	lb.
April	3	. . .	,,	8 ,,	12½	,,
,,	10	. . .	,,	8 ,,	12	,,
,,	23	. . .	,,	8 ,,	11¾	,,
May	1	. . .	,,	8 ,,	11¼	,,
,,	8	. . .	,,	8 ,,	11¼	,,
,,	16	. . .	,,	8 ,,	10½	,,
,,	22	. . .	,,	8 ,,	9	,,
,,	29	. . .	,,	8 ,,	8	,,

Since the delivery of the preceding lecture, the patient has made steady progress towards a better condition. She has been residing since June at her own home, and has gradually but uninterruptedly gained strength, so that she is able now, November 1899, to do some house work, and to take walks of some distance. It therefore seems probable that the administration of thyroid substance in her case is of real use.

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[1] *Brit. Med. Journ.*, London, 1893, vol. ii.
[2] *Berl. klin. Wchnschr.*, 1895.
[3] *Semaine méd.*, Paris, 1895.
[4] "Atlas of Clinical Medicine," 1892, vol. ii.
[5] *Am. Journ. Med. Sc.*, Phila., 1893.

THE BACTERIOLOGY OF TYPHUS FEVER.

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(PLATE XIV.)

IN this Journal for February of the present year we published a preliminary notice of some work done by us in connection with the bacteriology of typhus fever. At that time we had had an opportunity of examining the blood in nineteen cases of the fever, and in six control cases, while seven cases had been investigated post-mortem. Since that date our research has been much extended, and in the following article we propose to embody the facts stated in the preliminary notice, to deal more fully with the bibliography of the subject than we were previously able to do, and to give a detailed account of our work up to the present time.

HISTORICAL.—The bacteriology of typhus fever is a subject which has received but scant attention.

M.M. Thoinot and Calmette described bodies which they found in the blood of typhus patients, and which somewhat resembled in shape human spermatozoa.

Kasan, in the blood taken from the finger-tips and in that of the spleen, found rounded bodies with filiform prolongations possessing movement. To these he gave the term spirochæte exanthematica. In one case, both during life and post-mortem, Le Gendre discovered a microbe like Eberth's bacillus.

Hlava of Prague, in 1891, and Lewaschew in 1892, described, the former a strepto bacillus as occurring in the blood, the latter small motile bodies of varying shapes.

Dubief and Bruhl made a careful study of a small epidemic of typhus which broke out in certain Parisian prisons in 1893. Their results may be very briefly stated as follows:—

In several of the post-mortems which they performed they found a diplococcus in the lungs and bronchial secretions. They did not find it in any other organ save when infarcts were present, in which cases they succeeded in obtaining it from the wedge-shaped areas. Microscopically, the organism appeared as an undoubted diplococcus, which they describe as small and fragile, apparently provided with a capsule, and non-motile. It stained readily by the ordinary methods, and also by the process of Gram. They were able to cultivate it, and found that it grew well in broth and milk, and on agar and potato. It would not grow at all well on nutrient jelly, even at a room temperature of 20° C., growth appearing only after eight days and being very poor. They also examined the blood of living patients, and in some cases found a similar organism, cultures of which, however, remained sterile. They injected broth cultures of this diplococcus into rabbits and guinea-pigs, with, as a rule, fatal results, a condition closely resembling pneumonia being produced. Cultures of the diplococcus were obtained from the blood of the inoculated animals during life or immediately after death.

Haushalter and Etienne failed to detect this diplococcus. Calmette, in a more recent article, states his belief that the various organisms found by Hlava, Babes, Combemale, Bruhl and Dubief are all identical with the bodies which he himself described.

Two Mexican observers who worked at the subject were unable to obtain any definite results.

It is interesting to notice that Zulzer states that he has infected rabbits with the fever by injecting into them blood taken from typhus patients before the crisis. No effect was obtained with post-critical blood, and at no time were dogs affected.

Lewaschew got no results by injecting his organism into lower animals.[1]

In this connection it may be mentioned that Levashoff has found beneficial results from the intravenous injection of the blood serum of typhus convalescents into patients in the acute stage.

General Statement.—Our experiments have been conducted upon forty-three cases of typhus fever, both in the acute and convalescent stages. Most of our cases were in the wards of the City Hospital, Edinburgh, but we extended our observations to cases in the Convalescent Home at Musselburgh, in the Leith Public Health Hospital, and in the Dundee hospital for infectious diseases.

In addition, the blood from twenty typhus quarantines, forty-six cases of enteric fever, twenty-one cases of scarlet fever, and two of measles, has been examined, while that of twenty-eight persons suffering from various disorders, and many of them resident in a typhus-infected area, has also been tested. By way of further control, observations have been made on the blood from seventeen healthy individuals, nine of whom had been exposed to the infection of typhus fever. In all, 220 blood examinations have been made, many of the cases being examined on several occasions.

Method.—We would have liked, if at all possible, to examine the blood directly from a vein, but this we found was not feasible, and therefore in every case the blood was taken from the thumb; —in adults the dorsal aspect being chosen; in children, the palmar. We saw no advantage in drawing blood from areas affected by the rash. Numerous experiments were made to ascertain how we might best purify the skin, and in the great majority of cases the following was found to be an efficient and easily applied method.

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[1] An interesting account of the latest work done by this observer may be found in the epitome, *Brit. Med. Journ.*, London, January 2, 1897.

The skin was thoroughly washed with warm water and soap, a nail-brush being employed. It was then washed with lysol. Thereafter it was rubbed with absorbent wool soaked in sulphuric ether, and a corrosive poultice 1 in 2000, or carbolic 1 in 20, was applied for ten minutes. On this being removed the skin was soaked in sterilised water, and then partially dried by means of a pledget of wool which had previously been plunged into boiling water.

In many cases the thumb was prepared as for operation,—by means of ether and the prolonged application of a carbolic compress 1 in 20; but we found that this method did not improve our results. In a few cases, where the cuticle was very thick and ingrained with dirt, the former precautions proved insufficient, but as a rule they proved fairly satisfactory. To obtain the blood, a needle was sterilised in the flame of a spirit-lamp, the skin pricked, the first drop discarded, and that exuding subsequently lifted by means of a sterilised platinum loop, or a loop and spiral of wire so combined as to increase the collecting surface. A tube of broth, samples of which had previously been incubated, examined, and found sterile, was then at once inoculated with the blood drop, and the whole placed in the incubator at 37° C. Agar, blood serum, and gelatine were occasionally employed in addition to the bouillon. Films of the blood, stained and unstained, and hanging-drop specimens, were also examined in several cases. Still further, we have been able to investigate twelve typhus cases post-mortem in Edinburgh, Leith, and Dundee, and eight control cases. In eleven of the twelve cases blood was taken from the heart and spleen, and either the lung or the liver, care being taken to sear the surface of the organ. An incision was made with a sterilised knife, and the blood collected as from the thumb in the living. In the remaining case the spleen alone was examined. The same procedure was adopted in the control cases.

1. EXAMINATION OF BLOOD IN LIVING CASES.—As stated above, forty-three cases of typhus fever were examined. These cases were of both sexes and of all ages. In forty of them the blood was taken while the fever was acute, ranging from the second to the fifteenth day. The remaining three were examined only after convalescence was well advanced.

In thirty-six out of the forty-three, *i.e.* in about 88 per cent., a diplococcus was found. The negative cases included two in Dundee, one in Leith, and two convalescents in the Edinburgh City Hospital.

The organism found appeared under ordinary high power (obj. 7, oc. No. 3, Leitz) as a well-marked diplococcus, 1 μ in breadth and about 2 μ long. It was non-capsulated, non-motile, and did not possess flagella. It had, however, a marked oscillatory movement, and could frequently be seen turning over and over in its long axis, both in ordinary and hanging-drop preparations. It stained well with carbol-fuchsin, gentian-violet, and retained the stain in Gram's method. In blood films and hanging-drop preparations the organisms were always found in the typical diplococcal form, but in such preparations they were extremely difficult to detect, being often hidden beneath the corpuscles and very few in number. It was for this reason that the broth culture was used, it being found that the organism in nearly every instance had multiplied enormously at the end of twenty-four or forty-eight hours. When examined in broth culture, in addition to the diploccocal form, tetrads, short chains, and clumps were occasionally present, but this was the exception. On staining, possibly as the result of heating, the organisms tended to run together and form clumps. No growth took place when the blood was transferred directly to solid media, even when the surface of the medium was moistened with bouillon.

Cultural characteristics.—Broth becomes cloudy, but tends to clear by deposit. The deposit is greyish white in colour when unmixed with precipitated blood. There is no pellicle and no odour to be detected. On agar the growth is somewhat characteristic, having exactly the appearance of a streak of white cement, and being both copious and rapid in its spread.

In three cases only, to be referred to later, was there any pigmentation. A similar growth occurs on blood serum, and Löffler's blood serum. On potato the growth is white and in no way peculiar. In jelly, stab, and streak preparations, the growth is slow at room temperature, but fairly rapid, *i.e.* appearing within forty-eight hours, at 22° C. In stab cultures growth occurs as a continuous streak or as small dots, is confined to the line of inoculation, and liquefaction takes place from above downwards, beginning, as a rule, about the fourth day when the gelatine is kept at a temperature of 22° C. The appearance is somewhat peculiar, and may be best appreciated by reference to the plate.

The organism grows rapidly when plated on agar jelly, the growth being diffuse and spreading, and more slowly when plated on nutrient jelly, in which it appears as tiny white colonies.

Liquefaction does not occur in plated cultures kept at room temperature.

There is no gas formation in glucose jelly. Milk is coagulated in forty-eight hours. Litmus broth shows acid reaction within twenty-four hours. The most favourable temperature for the growth and development of the organism appears to be 37° C. It resembles the ordinary pathogenic coccal forms, in being a facultative anærobe.

In a very few cases, always supposing that the special diplococcus had its habitat in the blood, our precautions proved insufficient, aerial or skin infection taking place, as sarcinæ were found along with the diplococci. No other form of organism was at any time encountered, with the exception of three severe cases, from which, on cultivation, a mixture of diplococci and staphylococci was obtained.

In the vast majority of cases one examination sufficed to prove the presence of the diplococcus, but cases were encountered which failed to exhibit it on the first or even the second examination, and yet gave it later; these results having no apparent connection with the stage of the fever, and being possibly accounted for by the small quantity of blood taken at one time.

In only a single instance after finding the organism did we fail, on subsequent examination, to again obtain it. The patient was one of our control cases, examined in a dispensary situated in a typhus-infected area. When examined, he was not known to have typhus, being apparently suffering from a severe influenzal pneumonia, and yet the diplococcus was found. A few days later we encountered him as a typhus patient in the wards of the fever hospital, when he was in a moribund state, and his extremities extremely cold. We again examined him, the blood being very dark, and obtained with difficulty; but nothing developed in the broth tubes, and we had no further opportunity of investigating its condition during life. The organism in this case was one of the three which on agar showed pigmentation. The colour from the first was a faint cream, which became slightly intensified, but was never yellow. There was no difference in form nor in the growth on other media from the usual appearance. The other two cases showed the same kind of pigmentation, which we could not attribute to any change in the agar. It is important to note that our typhus patients were not all of a poor and dirty class. Amongst them were two nurses, whose blood gave pure cultures of the diplococcus, while several others were persons of fairly clean habits, who had previously lived under moderately good conditions.

Of our five negative cases, two were convalescents—one a man at the fourteenth day after his crisis, who had not been examined during the acute stage. We were unable to take his blood on more than one occasion. The other case was that of a woman in whose blood the organism had always been found during the fever, and the negative result was got when she had been convalescent for three weeks (*vide* Convalescent Cases). Of the remaining three, two were Dundee cases, and it appears to us quite possible that our failure in these instances may have been due to the time which elapsed between the inoculation of the broth and its transference to the incubator, and perhaps, to some extent, to its agitation in transit. In this connection it is curious that one of the positive cases from Dundee showed no sign of growth till seventy-two hours had elapsed. Such a lapse of time before the appearance of cloudiness in the broth was quite unique.

No. 5 was a case in Leith Hospital, and though taken twice at different stages of the fever, the broth remained absolutely sterile, though incubated for more than a week. This patient was very ill, suffered from great coldness of the hands and feet, and, as in the case mentioned above, the blood did not flow readily on puncture.

Our convalescent cases fall under two heads—those which were examined both before and during convalescence, and those which were tested only in the latter stage, and one of which has already been referred to as a negative case. It was well-nigh impossible for us to follow out those cases as they left the hospital. With the exception noted, the diplococcus was found in every case during the first few weeks immediatedly following the crisis. In two cases we failed to find it after the twenty-ninth day; while, in the only case which we had the opportunity of examining regularly after the seventh week, the organism was absent, though the blood was taken at frequent intervals till the tenth week of convalescence. During the course of the epidemic, quarantine was instituted both in Edinburgh and Leith on persons who had been in contact with those suffering from typhus. We considered it advisable to extend our researches to these quarantine cases. Unfortunately we did not at first make a routine practice of examining every quarantine, but eventually, having missed some cases which might have proved instructive, we did so, and the result was certainly interesting. In all, twenty persons were examined, and in three of them we found the diplococcus. One of these was a boy who, previous to examination, had a slight rise of temperature, and Dr. Ker is of opinion that he may possibly have had one of those abortive attacks not uncommon in children. The second, also a boy, had been sleeping in the same bed with his elder brother, both being quarantines. This brother developed typhus, and was one of our positive cases. Unfortunately, he was not examined while in quarantine. The younger boy at no time had any temperature; and though his blood was taken twice subsequently, it failed to again show the organism. The third case was one of a group of very dirty Italians. He was discharged from quarantine, having shown no signs of the fever. On two occasions his blood gave positive results. The other Italians did not show the organism, but their blood broths rarely remained sterile—sarcinæ, diplococci, and staphylococci being frequently found. These may in part have been due to aerial infection, the ward being outside the hospital, and not regularly in use. In no other ward did we meet with such impurities. There can be no doubt, however, that in some cases the contamination was from the skin, as the *Staphylococcus pyogenes aureus* and its diplococcal form occurred in the broth cultures. A second and small outbreak of typhus occurred in Edinburgh in the summer of 1899, and we were careful to examine every quarantine case. In one only, and that after the application of a corrosive poultice for three hours, did we find the diplococcus —all the other blood broths remaining absolutely sterile. It is remarkable that this person alone developed the fever. The blood taken on the fourth and seventh day of the fever showed nothing, but on the fourteenth day we found the typical organism as the temperature was beginning to fall.

2. Control Cases.—(*a*) *Normal.*—Of these there were seventeen, including nine exposed to typhus infection. In none of them, although several were repeatedly examined, did we discover the diplococcus. In some we took the blood without any aseptic precautions, and in such cases mixtures of staphylococci, streptococci, and diplococci, as well as various forms of bacilli, were obtained. These appeared to be the ordinary organisms of the skin, and diplococcal forms were but rarely found, and never alone. In one instance a very fine streptococcus, closely resembling, both microscopically and in culture, that described by Klein in scarlet fever, was encountered. One case, negative upon a first examination, subsequently yielded a white staphylococcus, which occurred largely in the diplococcal form. This diplococcus was quite distinct from that found in typhus, being much larger, while its growth on agar was different; it did not liquefy gelatine at 22° C.

(*b*) *Measles.*—The two cases taken, an adult and a child, yielded nothing.

(*c*) *Scarlet.*—All were acute cases. Of the twenty-one blood broths investigated, fourteen were sterile. In two of the remaining seven our precautions proved insufficient, and a mixed coccal growth resulted. One of these two, however, was intentionally done without ether. Another case was remarkable, as it yielded a pure culture of the *Streptococcus scarlatinæ* of Klein. The other four gave diplococcal forms. Three we were able to distinguish by cultural methods from the organism found in typhus. The fourth resembled it closely, and appeared to us to be identical with it.

(*d*) *Typhoid.*—At a later period we deemed it advisable to examine cases of enteric fever, and, on doing so, were surprised to meet with the same diplococcus which we had found in typhus. Forty-six cases were investigated, and in forty, *i.e.* 87 per cent., the typical organism was found. All these cases gave the Widal reaction, with one exception; this doubtful case, however, yielding the typical diplococcus. As in other instances, a certain percentage of cases showed impurities, such as sarcinæ, staphylococci, large diplococci, etc.; but the great majority gave pure cultures of a diplococcus exactly resembling that found in typhus. As far as we can make out, the organism seems, as in typhus, to disappear after convalescence is well advanced. One case proved specially instructive. During the fever, and for some time after the temperature had become normal, it repeatedly yielded pure cultures of the diplococcus. During the fifth week of convalescence the blood from both thumbs was examined at the same time. The skin of one thumb we purified in the usual way, while that of the other we left untouched. In the former case the broth remained sterile; in the latter, a mixed growth of minute cocci and small bacilli was obtained—nothing like the diplococcus being present.

(*e*) *Other diseases.*—Twenty-eight cases were examined, including fourteen dispensary cases in the typhus-infected district.

Patients suffering from various ailments, *e.g.* pneumonia, influenza, diphtheria, cardiac and renal trouble, etc., had their bloods tested. Although in some of them impurities from the skin were obtained, the typical organism was only once found. In two cases of influenza—both dispensary patients—diplococci were present. In one of these cases no antiseptic was applied to the skin, but the other was treated in the usual way. In the latter the organism gave the cultural characteristics which we regard as typical of the diplococcus under consideration; but in the former its growth on agar was of a brilliant yellow colour, and it differed in other respects.

3. POST-MORTEM CASES.—Twelve patients dead of typhus fever were examined, and the following eight control cases:—(1) Head injury, (2) uræmia, (3) whooping-cough, (4 and 5) septic peritonitis, (6) typhoid, (7) diphtheria, (8) multiple miliary tuberculosis. Our typhus cases were examined as soon after death as possible, and all but one yielded a diplococcus. With the exception of three, they had all been examined during life, and had given positive results. None of them showed any special complications, with the exception of the pulmonary congestion so frequently present in persons dying about the crisis of the fever. The single "negative" post-mortem gave a diplococcus during life, but this diplococcus presented quite peculiar features when cultivated. It did not liquefy jelly, but spread out on the top of the gelatine as a yellowish growth, and was somewhat slow in coagulating milk. We have included this as a positive case, but it was one of the three previously mentioned which yielded a mixture of staphylococci and diplococci, and we were unable by plate culture to separate out two varieties of organism.

To return to our post-mortem cases. In one instance a complete examination could not be made, and all that was done was, with antiseptic precautions, to introduce into the spleen a large hypodermic needle, and to transfer several drops of splenic pulp to a broth tube and tubes of solid media.

Films and hanging-drop cultures, in addition to the tube preparations, were made from several of the other cases. From the spleen mixed cultures as a rule resulted, there being along with the diplococcus the *Bacillus coli communis*, the *B. proteus*, and other bacillary forms. Sarcinæ and streptococci were occasionally present, but staphylococci were only once found, and that in the heart's blood. We were able by plate cultivation to isolate the diplococcus in nine out of the eleven cases.

In eight of these nine cases we obtained an absolutely pure culture from one or other of the organs; in three from the heart alone, and in one from the liver alone. In two the spleen alone yielded a pure culture, obtained in one of the cases from a splenic infarct, the rest of the splenic pulp giving diplococci and bacilli. Of the remaining two cases, one gave the diplococcus from both spleen and heart, the other from both heart and lung. Microscopically and in culture the diplococcus seemed to be the same as that obtained in the living blood, the only difference being that its growth on agar, jelly, and potato was, except in one case, pigmented. The streak was white or faint cream at first, but in the course of a few days gradually assumed a distinct orange yellow,—the first evidence of pigmentation beginning at the margins of the growth and spreading inwards. The colour varied in intensity, and took longer to develop in some cases than in others. The growth on blood serum was always white.

In several instances direct inoculation on solid media proved successful, in this way differing from the living cases.

One case was exceptional, inasmuch as the diplococcus obtained from it was quite unlike that usually found. Its growth was white; it neither liquefied jelly, nor retained the stain by Gram's method; and it was not so large as the usual organism.

We failed to find the special diplococcus in any of our control cases; indeed, we never at any time encountered a diplococcal form. The most common organisms met with in the heart's blood of these cases were streptococci, as one might have expected from their septic nature.

EXPERIMENTS ON ANIMALS.—Our results were such that, considering the rarity of typhus epidemics at the present day, we felt justified in investigating the effect upon animals of the organism which we had so frequently encountered.

Unfortunately we were at first unable to make use of fresh cultures. The slight recrudescence of the disease in the summer enabled us, however, to test the organism before it had run the risk of becoming attenuated or otherwise altered in its action.

The animals employed were rabbits, guinea-pigs, and monkeys, the last-named being specially chosen owing to the remarkable esults obtained from them in the case of relapsing fever, a disease which in several respects may be said to resemble typhus

It was necessary to investigate the pathogenicity of the diplococcus derived in the first place from living patients, and secondly from the organs after death, and we considered it well to test the effect in both instances by subcutaneous and intravenous injection. It seemed to us that, to begin with at any rate, no benefit would be derived from intraperitoneal inoculation, considering the complications which are apt to ensue, and the unsatisfactory results obtained in the case of other micro-organisms by this procedure.

There appears to us to be no need in this place to give the experiments in detail, as this would merely mean a wearisome repetition and take up much valuable space, while a general survey with comment upon any fact of importance will adequately explain our results.

1. *Rabbits.*—(*a*) Eight inoculations were made of 24- to 48-hour broth cultures of the diplococcus obtained from the living at stages of the fever preceding the crisis.

In three cases the organism had recently been obtained, and had not undergone subculture beyond transference from the original broth tube to that used for inoculation. In one, the contents of the original tube containing the blood drop and the culture were employed. Six of the eight experiments were done subcutaneously, doses varying from ·5 to 5 c.c. being injected under the skin of the back, which had been specially prepared by the application of an antiseptic, etc. The remaining two were intravenous, the auricular vein being chosen, and 1 c.c. being introduced on both occasions. With one exception, very little effect was produced, the animals being slightly feverish and refusing food for a few days, and then regaining their normal condition. Locally, nothing was noticed beyond a slight induration at the seat of the injection. One of the subcutaneous cases was killed by anæsthetics several days after inoculation, but no organism was recovered from the blood, post-mortem.

The exceptional case deserves further note, and it should be mentioned that this was not the animal which received the contents of the original broth tube used for collecting typhus blood.

On 28th March a rabbit with a normal rectal temperature of 99°·6 F. received a subcutaneous injection of 5 c.c. of a 24-hour broth subculture of a diplococcus obtained from a severe and subsequently fatal case of typhus when the fever was at its height. There was no immediate effect. On the following day the temperature, which was daily taken at the same hour, had risen to 102°·6 F. The animal looked ill and refused food. This condition persisted till 31st March, when a swelling appeared at the seat of inoculation. This swelling, which at no time showed fluctuation, was present till 10th April, but gradually diminished in size. The temperature remained elevated, and the rabbit was distinctly ill. On the thirteenth day after inoculation the temperature fell, but, after remaining normal for four days, again rose, and the animal, which had not improved with the fall of the temperature, became worse. On 29th April, the temperature being 103° F., and the animal evidently dying, it was killed by anæsthetics, as we were anxious to test the blood immediately after death. A post-mortem was at once made, and broth tubes inoculated in the usual way with blood from the heart, spleen, and liver. Growth took place in the last-named alone, and on examination the typical diplococcus was discovered. All that was found post-mortem was slight congestion of the lungs and liver. There was no enlargement of the spleen.

(*b*) Eleven inoculations with the post-mortem diplococcus from various sources were made, three of these being intravenous.

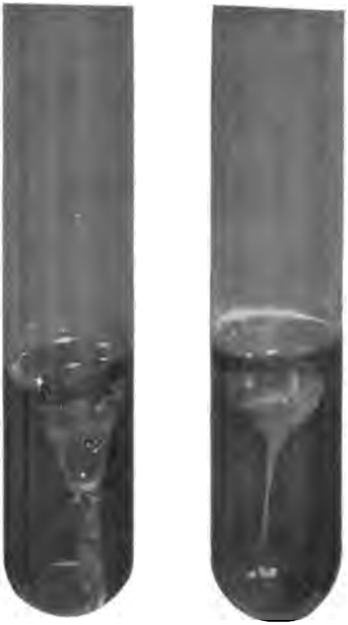
These latter all proved rapidly fatal, and it was found here, as in other cases, that the virulence of the organism could be increased by employing Klein's method of adding a small quantity of boiled white of egg to the broth culture.

The signs and symptoms were similar in each case, namely, rise of temperature, shivering, and refusal of food, ending in collapse on the ninth day in the cases which received the ordinary culture, and on the fourth day in the case in which the more virulent organism was employed. 1 c.c. was the amount injected in each instance. In all three cases the typical diplococcus was obtained post-mortem, while nothing but slight lung congestion was found. In eight rabbits subcutaneous injection was employed. In four of these there was practically no effect produced, but in two of the four, the organism introduced was taken from cultures several months old, these being at the time the only specimens available. The diplococcus was still living, as proved by its readily growing when subcultures were made, but it was probably attenuated, and no attempt was made to increase its virulence.

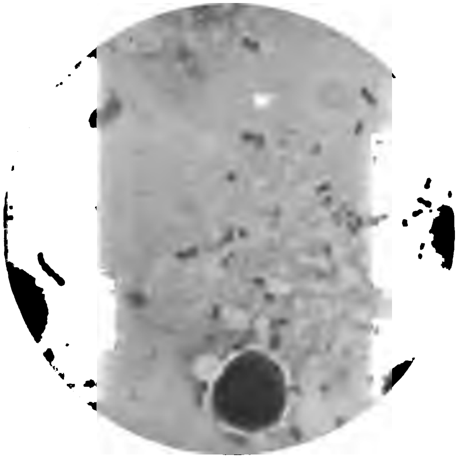
In relation to another of these negative cases, it should be noticed that the rabbit before inoculation had been put into a hutch previously occupied by an animal that had succumbed to an inoculation, and which the attendant had neglected to disinfect. The uninoculated rabbit became extremely ill with all the symptoms which we have described. It recovered, however, and was then inoculated, with negative results as stated. Of the remaining four, one was slightly ill for a week, and then recovered. Another rabbit died on the fourth day after inoculation with 5 c.c. of the same post-mortem diplococcus, which proved so fatal when injected intravenously. This animal's temperature ran up as high as 104°·4 F., but fell somewhat before death. It showed marked difficulty of respiration, with indrawing of the diaphragm and intercostals, and presented a considerable degree of œdema of the head and neck. Post-mortem, a diffuse red rash was found extending all over the skin of the chest, and there was extensive œdema of the cellular tissue in the regions mentioned. The

PLATE XIV.

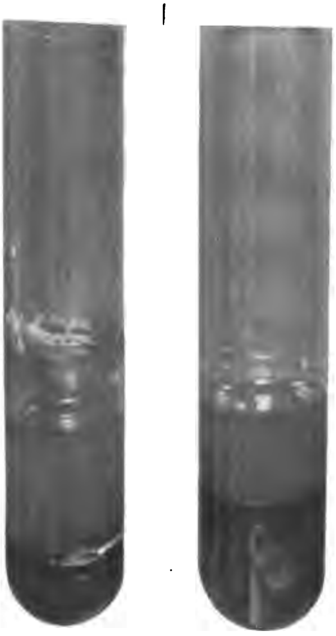
Diplococci from blood-broth. Typhus.
Carbol fuchsin, × 1000.



Jelly stab cultures; Early liquefaction.



Diplococci from lung juice. Typhus post-mortem.
Note chain of three simulating streptococcus.
Carbol fuchsin, × 1000.



Jelly stab cultures; Advanced liquefaction.

internal organs all showed congestion, but there was no other morbid appearance. The typical organism was recovered from the blood of the heart, spleen, and lungs, and also from the fluid exuding from the œdematous area. Two cases have yet to be considered, but the one was merely a sequel to the other. In the first, infection probably took place at the seat of inoculation—a large abscess forming, in the pus of which a mixed coccal growth was found. The animal was etherised, discovered to be pregnant, and no organism was obtained post-mortem, save from the abscess cavity. The blood taken during life, in the same way as from a human subject, yielded nothing. The inoculation of this diplococcus in other cases never caused abscess formation. The second rabbit received an injection of a diplococcal culture made from the pus. It showed much the same symptoms, but on post-mortem examination diplococci were found in the heart's blood.

Guinea-pigs.—These may be dismissed in a few words. Two received subcutaneous inoculation, the first from one of the old cases mentioned, and with no effect. The other, inoculated with a diplococcus derived from a living patient, also gave negative results. We were unable to make further experiments on guinea-pigs.

Monkeys.—Five monkeys were inoculated. As in the case of rabbits, we shall divide the monkeys into the two classes—those inoculated with the organism from living patients, and those in which the post-mortem organism was employed. Under the former there was only one case—a monkey which received intravenously 1 c.c. of an elevated broth culture from the blood of a living typhus patient. There was absolutely no effect produced. Under the latter, six inoculations were made, a couple of the monkeys being inoculated on two occasions.

On 13th June a large monkey was subcutaneously inoculated with 5 c.c. of a 24-hour broth culture made from an agar streak of a diplococcus obtained post-mortem. This was one of the organisms which proved so fatal to rabbits intravenously. Within three days the animal showed signs of illness: it was shivery, refused food, and was very quiet and subdued. There was no change at the seat of injection. It continued in this state for about a fortnight, when it regained its normal appearance. During this time, however, it sustained an accident to one foot, which may possibly have accounted for some of the symptoms. On the nineteenth day after inoculation its blood was taken in the same way as in typhus patients, and also from a vein, though not directly, *i.e.* it was taken through the skin. It was very difficult to purify the skin thoroughly, and the resulting cultures exhibited diplococci which proved to be typical, as well as sarcinæ and motile bacilli. At a later date the blood was again taken with greater antiseptic precautions, and diplococci alone were found. On 25th July the same result was obtained, and on that date the animal received a second dose of the same diplococcus—the only difference being that the organism had been grown in broth to which boiled white of egg had been added. Curious to say, no illness resulted.

A monkey of the same species was inoculated subcutaneously on 13th June with 5 c.c. of a 24-hour broth culture of a diplococcus obtained post-mortem from another case of typhus. This organism was that which in a rabbit produced temporary illness. In the monkey it produced no effect, not even a rise of temperature. The blood was taken on 9th July, and the broth tube remained sterile. On 25th July this monkey received 3 c.c. of a 24-hour elevated broth culture of the post-mortem diplococcus, with which the first monkey was inoculated. It was slightly ill for about a week, but gradually recovered. Its blood, taken on 1st August, yielded a culture of the diplococcus, and it is remarkable that, whereas an organism with a pigmented growth on agar was injected, that which was recovered gave a white-cement-like growth exactly resembling the culture of the diplococcus obtained from the living blood of typhus patients.

A young monkey received subcutaneously 3 c.c. of a broth culture of the diplococcus recovered from the blood of the first monkey. No illness followed.

A monkey of a different species was unaffected by an intravenous injection of 1 c.c. elevated broth culture of the post-mortem diplococcus already mentioned.

Extra Cases.—A rabbit was inoculated intravenously with 1 c.c. of a broth culture of the diplococcus obtained from the living blood in a case of enteric fever. No effect was produced, as was the result when another rabbit received subcutaneously 5 c.c. of a mixed culture of this diplococcus and the typhoid bacillus.

Conclusion.—It will be at once evident that the important question arises in connection with the living typhus cases: Is this diplococcus really derived from the blood, or is it merely a skin infection? This leads us into a brief consideration of the organisms which are found in the deeper layers of the human skin, for we think it must be admitted that our methods were at least sufficient to thoroughly purify the surface of the cuticle. The most concise and intelligent accounts of this matter are to be found in Mr. Lockwood's "Aseptic Surgery" and Mr. Damman's well-known essay, but in addition, much work has been done on this subject in Germany and America. Numerous forms of bacilli, such as the *B. epidermidis capsulatus*, the *B. gelatinosus*, and in the skin of the fingers the *B. fluorescens epidermidis*, have their natural habitat in the deeper parts of the sudoriparous and sebaceous glands. Several varieties of cocci and the *Sarcina lutea* are also met with, but all that need concern us here is the fact that the *Staphylococcus pyogenes albus* and *citreus*, which are constantly found, tend very largely to occur in diplococcal form. Such diplococci, on cultivation, are said to be distinguished by the peculiar acrid and offensive odour which they produce, and which has been likened to decomposing sweat. It is, however, quite possible that forms do occur which do not give this cultural characteristic. Again, it is generally admitted by surgeons that it is quite impossible to make certain of rendering the skin absolutely sterile, though Lockwood, by methods very similar to those we employed, found this could be done in a fair percentage of cases. The proper procedure would, of course, have been to expose a vein; but such a drastic measure is very properly impossible in this country. We considered the advisability of blistering the skin, but this idea had also to be abandoned, and, in any case, would probably have been of little use. It therefore remained for us to attempt to solve the problem by taking a large number of control cases, and by making as many post-mortems as possible. It will be observed that in the great majority of our control cases, and especially in normal persons, when our antiseptic precautions were fully carried out, the broth tubes remained sterile, no organisms being washed out by the blood-drop from the deeper layers of the skin. Again, in no cases where ether and the sublimate were used did we meet with any bacillary forms, though we encountered them in unpurified cases. Sarcinæ and staphylococci were the chief impurities, and, as stated, diplococcal forms were frequently present along with the grape-like clusters. Such diplococci, however, were certainly unlike those so persistently met with in typhus and typhoid, and so very rarely in any other condition.

What we regard as the typical diplococcus is a smaller organism, with a much more definite outline and a marked oscillatory movement. Further, it occurs as a pure diplococcal culture, though under certain circumstances, as mentioned above, it forms small clumps and chains. Its cultural characteristics are also somewhat distinct from those presented by the ordinary white staphylococcus, but it must be confessed, in the light of recent investigations, that much stress cannot be laid on the general appearance of a growth on agar or a jelly liquefaction.

Our chief reasons, however, for thinking that the organism is derived from the blood, are—

(*a*) The fact that it occurred so persistently in typhus and typhoid cases.

(*b*) The occurrence post-mortem of an organism almost identical with that derived from the living blood, the only difference between them being that while the latter is apparently non-pathogenic and non-pigmented, the former is both pigmented and pathogenic, at least to rabbits. Supposing it were a skin organism, it would be very remarkable that we should meet with it alone in such a large number of cases, and that our antiseptic precautions should have failed in typhus and typhoid alone.

It must not be overlooked, however, that we met with an organism exactly similar, as far as we could tell, in one case of scarlet fever and in one case of influenza—both, be it noted, febrile conditions.

Knowing, however, that statistics cannot be absolutely relied upon, we attempted to decide the question—(1) By placing in broth pieces of skin purified as in the living, and removed with due precaution from freshly amputated fingers and thumbs, and incubating them at 37° C.; (2) by the method of testing whether or not the diplococcus would grow in liquid blood serum in which it is probable a skin organism could not survive.

1. In the broth we never met with the typical diplococcus. The most common organism was the white staphylococcus occurring frequently in the large diplococcal form to which we have already alluded. One marked difference between this diplococcus and that found in typhus and typhoid, a difference not previously mentioned, is the much greater space between the elements constituting the organism.

2. We have not as yet had time to draw any conclusions from our work in this direction, but it would appear that both the post-mortem diplococcus and that derived from living cases survive in the blood serum. They do not, however, seem to multiply as in broth.

The diplococcus resembles in many ways that described by Dubief and Bruhl. They, however, were unable to cultivate it directly from the fresh blood, though they do not state what media they employed. Their organism in blood films showed a distinct aureole like a small capsule, and when derived post-mortem could not be grown upon blood serum. Inoculation in animals produced a pneumonic condition and infarcts in the kidneys.[1] Otherwise, however, both microscopically and culturally, there is a considerable resemblance between the two diplococci.

Our animal experiments were somewhat unsatisfactory, owing to the difficulty of obtaining fresh cultures. There can be little doubt, however, that the post-mortem organism is markedly pathogenic, producing symptoms and post-mortem appearances closely resembling those of a continued fever.

We would call special attention to the fact that, after injecting a pigmented pathogenic organism into a monkey, we recovered, presumably from its blood, an unpigmented, non-pathogenic diplococcus.

Is this an example of the power of the living blood to lessen or abolish pathogenicity? The only fallacy, of course, in such a conclusion is that the latter organism may have been derived from the animal's skin, despite our precautions. This matter, however, has been fully discussed.

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[1] *Arch. de méd. expér. et d'anat. path.*, Paris, June 1894.

Another point of interest is our failing to find post-mortem the unpigmented, non-pathogenic organism after the injection of 5 c.c. of a broth culture subcutaneously.

Owing to the lack of fresh material, we decided to discontinue our animal experiments, but should the opportunity arise of continuing them, we hope to be able to take advantage of it.

It was specially unfortunate that we were unable to obtain more typhoid post-mortems. It will be remembered that no diplococcus was found in the solitary case investigated. The spleen, however, alone was examined.

Although the result obtained post-mortem in typhus, and the inoculations with the diplococcus so derived, are very suggestive, we feel that we cannot at present definitely state that this organism is an etiological factor in the fever, though such, on further investigation, may prove to be the case.

It is difficult to account for the occurrence of the diplococcus in living cases of typhus and typhoid.

It is curious it should not have been previously described in the latter fever, but an explanation of this may be found in the great difficulty of detecting it in blood films and hanging-drop preparations. On several occasions a microscopic examination of nearly two hours' duration was required before it could be discovered. It must also be remembered that the organism will not grow directly on solid media. It would appear that in broth alone it gets a chance of developing when inoculated at a suitable temperature.

We have again to express our great indebtedness to Professor Hunter Stewart and to Dr. Ker for their kind assistance and advice. To Dr. Leslie Mackenzie and Dr. Templeman, the medical officers of health for Leith and Dundee respectively, we would also tender our sincere thanks for the cases they so kindly placed at our disposal, and the numerous facilities they afforded us in our work.

ATHEROMA OF THE AORTA.

By JOHN R. AMBLER, M.R.C.S., *Senior Assistant Medical Officer, County Asylum, Chester.*

HAVING remarked the frequency of atheroma of the aorta, met with in the post-mortem room at the County Asylum, Chester, it occurred to me to take the reports of 100 consecutive necropsies, written by myself. Dr. Mott, the pathologist to the London County Asylums, has remarked this frequency, and he compares the reports of Charing Cross Hospital with the various asylum reports of post-mortem examinations, and remarks on the greater frequency of atheroma of the aorta in the asylums. In 1600 necropsies at Charing Cross Hospital, atheroma of the aorta was noted in 222 cases; at Claybury Asylum, out of 160 cases, atheroma was noted in 113 cases; some of these occurred in old age, and were probably the result of old age, therefore he only considered those who died of general paralysis or were under 45 years of age, and found that out of eighty-six cases atheroma was noted in twenty-four. Sixty of these were general paralytics, and of these twenty-two showed atheroma. These results were from notes made by several observers. Then he took notes of post-mortems made by one observer, who found that in general paralytics (males) atheroma was noted in over 50 per cent. of cases, and in the non-general paralytics over 33 per cent.; in the female, non-general paralytics under 45, over 33 per cent., and in eight female general paralytics six showed atheroma. In the cases I am referring to, I have, generally speaking, noted a larger percentage than this.

My cases are composed of—fifty-three males and forty-seven females; and I noted atheroma of the aorta in 69 per cent. (*a*) Some degree being present in ten males and sixteen females: (*b*) marked atheroma in seventeen males and nine females; and (*c*) very marked in fourteen males and three females; the total number of male cases being forty-one, and female cases twenty-eight. It was absent in 31 per cent.: males, twelve; females, nineteen; total, thirty-one.

I have classified the causes of death in seventy-one cases; the remaining twenty-nine were 60 years of age and over, and I noted varying degrees of atheroma in all except three, namely, one male and two females, and of these I will take no further notice, but will consider the relative frequency of atheroma of the aorta in general paralysis, phthisis, morbus cordis, aneurysm of thoracic aorta, etc. General paralysis was the cause of death in twenty-two cases, nineteen males and three females. Sixteen male cases showed atheroma in varying degree, and two female cases; only three males and one female showing none.

Phthisis pulmonalis was the cause of death in twenty-four cases, eleven males and thirteen females; and in these less than a third of the women and nearly two-thirds of the men showed some degree of atheroma, but in only one male was the atheroma marked, contrasting very strongly with general paralysis, in which atheroma was, in both the male and female cases, generally well marked.

Valvular disease of the heart, of eight deaths, three males and five females; atheroma being present in two males and four females, but not to any considerable extent.

Aneurysm of the thoracic aorta, of three deaths, two males and one female; in these three cases the atheroma was, as one would expect, very extensive.

Now, of the remaining fourteen, one male died of pleurisy, æt. 45, and one female of pneumonia, æt. 54—in neither of whom was there any atheroma. One female died of gangrene of lung, æt. 46, some degree of atheroma being marked. Five females died of epilepsy, in three of whom atheroma of the aorta was absent; in one there was some degree present, in another it was marked.

The remaining five cases died of exhaustion from mania and melancholia, and atheroma was only marked in one case—a male.

The average age of all cases in which atheroma was noted was—Males, 53·14 years; females, 52·37 years. In general paralysis in which it was noted, the average age was—Males, 45·37 years; females, 40·5 years. In phthisis pulmonalis in which it was noted, the average age was—Males, 41·18; females, 36·46.

If we compare the average age at death in phthisis pulmonalis and general paralysis, we find that both males and females are younger than in general paralysis; phthisis pulmonalis, however, is, generally speaking, a disease of younger persons than general paralysis; and in my cases the atheroma of the aorta was much less frequently present, and was of not nearly the same extent.

The question to consider is, what is the cause of this great frequency of atheroma of the aorta? Is it the result of disease? If so, what disease? Or is it simply the result of impact of the blood? Syphilis, by competent observers, is assigned as a great cause of brain disease, especially in people of middle life; but it is difficult to obtain a satisfactory history in the majority of cases; and is it asking too much to state that the young cases were not likely to be suffering from arterial degeneration? I do not feel able to discuss the causation of the change in the aorta as yet, but hope that, as time goes on, more light will be thrown on the subject.

CLINICAL RECORDS.

TWO CASES SHOWING THE EFFECT OF EXTREME COLD ON INJURY.

By Henry A. Duffett, F.R.C.S., *St. Leonards-on-Sea.*

Cases of well-marked gangrene following injury are rare in these days of asepsis and antisepsis, but I have been fortunate enough lately to have seen two well-marked cases, following slight injury, the subsequent history of which was greatly modified by extreme cold.

Gangrene is defined as "the death of visible portions of the tissues," and two main clinical varieties are recognised—the moist form and the dry form.

By far the most common form of gangrene is due to crushing or other severe injury, and whether it will assume the moist or the dry form depends entirely on the possibility of keeping the part aseptic; if from the first we can prevent the entry of septic bacteria by strict asepsis, the injured portions of the tissues will gradually become absorbed and reorganised into fresh tissue; and, beyond some local sloughing of the parts past recovery, no bad effects will follow, and healing will take place as under a blood-clot; whilst, if antiseptic precautions have not been taken, or have been impossible, the case will rapidly assume all the terrible characteristics of moist gangrene, with its rapid extension, severe constitutional symptoms, and frequent fatal termination.

The difficulties that attend the aseptic treatment of injuries by crushing, etc., are so apparent, that we may consider ourselves fortunate if we can manage to escape the more serious complications, and have but the tedious and prolonged local condition to contend with.

In the two cases that came under my notice, it can hardly be considered that any precautions had been taken, and the local condition was profoundly altered by the extreme cold that was prevalent both at the time and subsequent to the injury.

The clinical characteristics of gangrene due to cold are well defined—(1) It is essentially a dry gangrene; (2) it is extremely slow in spreading; (3) the attempts at a line of demarcation are slight and often abortive.

The gangrene due to extreme cold is due to the contraction of the blood vessels passing on, in extreme cases, to their complete occlusion, this being associated no doubt with rupture of the vasa vasorum and the subsequent degeneration of the vessels. An ascending degeneration has also been described in the tubules of the nerves.

Case 1.—R. J., a sealer, of many years' experience and well used to the severest cold, employed on one of the sealing steamers in the Gulf of St. Lawrence, received a severe injury to the middle finger of the right hand through it being caught in the cogs of a winch. At the time of the injury the hand was in a filthy condition, and covered with oil and dirt. No doctor is carried on these boats, and the stock of dressings and the treatment is distinctly primitive. The finger was simply wrapped up in a by no means clean piece of lint, and beyond washing it every morning with ice-water nothing was attempted. The cold was intense about this time, and the man was out on deck all the time. The sealing steamer came up with the boat on which I was surgeon about a fortnight after the accident, and I was asked to see the man. The finger then to within ¾ in. of the metacarpo-phalangeal joint was black and shrivelled, quite insensitive, and smelt most foully. The last two phalanges were protruding through the skin, which was hanging in shreds, and there was no sign of a line of demarcation. Though there had been severe pain in the hand, this was now quite absent. There was no lymphangitis, and no albuminuria. His general condition was fair, and temperature 99°. The man himself thought that the blackness was spreading, but slowly. I amputated the finger the same evening by a circular incision with a dorsal cut, and removed the head of the metacarpal bone. No vessels required ligaturing. The flaps came easily together, and the stump was dressed with iodoform gauze. Much to my surprise, primary union took place, with the exception of one small place, and this soon healed, notwithstanding the dirt of his surroundings, and in ten days he was able to return to his work with a leather shield over the hand.

Case 2.—J. S., a fireman, received a severe injury to his foot by a heavy weight falling on it. Here, again, all the chances were in favour of moist gangrene, the fourth and fifth toes badly lacerated and crushed, and the bones bare in places. The toes were black and shrivelled, and the foot red and œdematous. This was the condition when I saw him a week after the injury. The foot had been wrapped up in a piece of lint smeared with vaseline, and no effort had been made to clean it in any way; there was no line of demarcation. I made the foot as aseptic as I could (not very successfully, I am afraid, however), and removed the fourth and fifth toes with about half of their corresponding metatarsal bones. There was only just sufficient healthy skin to cover the stump; the foot was wrapped up in iodoform gauze. For a few days some troublesome suppuration took place, but this soon subsided, and the wound healed by granulation, and in about a fortnight was completely healed.

I think there can be no doubt that, under ordinary circumstances, these injuries might have been very much more serious than they proved to be, and I cannot but think that their favourable course was very largely due to the severity of the cold which produced this form of dry gangrene.

A CASE OF RECOVERY AFTER DRINKING HALF AN OUNCE OF LINIMENT OF ACONITE.

By W. A. Potts, B.A. (Cantab.), M.D. (Edin.), Birmingham.

Early on the morning of 16th August 1899, I was called to see a man, æt. 75, who had accidentally taken a large dose of liniment of aconite. He was under treatment for sciatica, and three days previously had been given a mixture to take by the mouth and a liniment to rub on the back of the thigh; the liniment consisted of equal parts of linimentum aconiti and linimentum saponis. On the morning in question, as he was suffering much pain, he got out of bed at 3 A.M. with the intention of taking a dose of the mixture; by mistake he poured out and drank two tablespoonfuls of the liniment. Directly he had done so, he recognised by the taste and burning in his mouth that he had swallowed the liniment. He therefore woke his wife and told her what had happened; she at once prepared and gave him a tumblerful of warm water with a teaspoonful of mustard in it, and immediately afterwards another tumbler of warm water containing a tablespoonful of salt. These draughts rapidly produced vomiting, and a few minutes afterwards violent purging also commenced. I arrived at 4.15 A.M., an hour and a quarter after the poison had been taken; during all that time there had been free vomiting and purgation. I found the patient sitting by the fire complaining of dryness and tingling in the mouth, and tingling in the muscles of the face, of pain in the epigastrium, and a feeling of weakness and shivering. The skin was dry, pulse 60, regular, but rather feeble, feet and hands cold; he was got into bed, hot bottles were applied, and $\frac{1}{40}$ gr. of strychnine injected hypodermically; the pulse was then slower, 55, and very feeble. Accordingly, another $\frac{1}{40}$ gr. of strychnine was injected, and as the vomiting had ceased an ounce of whisky was given by the mouth; the purging had now also stopped; the pulse began to improve in twenty minutes, and about the same time the feet and hands began to get warm. The tingling, at first confined to the face, had spread half an hour after my arrival so as to involve the whole body; the mouth felt very dry, and there was complete loss of the sense of taste; there was slight impairment of vision. At 5 A.M. all the symptoms began to pass off, and the subsequent improvement was rapid; hot tea was given to drink at intervals. By 6.30 A.M. the sense of taste had returned, the tingling and all other unpleasant sensations had disappeared, except a feeling of weariness. The pulse was then 68, and of fair strength. He had breakfast at 9 A.M., but remained in bed during the day; the next day he got up quite well, the sciatica being cured; unfortunately, it returned three days later.

This case is of interest, as it shows the possibility of recovery after swallowing so large a quantity as half an ounce of liniment of aconite.

REVIEWS OF BRITISH AND FOREIGN LITERATURE.

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Atlas of Urinary Sediments, with special reference to their Clinical Significance. By Dr. HERMANN RIEDER, translated by FREDERICK CRAVEN MOORE, edited and annotated by A. SHERIDAN DELÉPINE. London: Charles Griffin and Co. Ltd. 1899.

To all who have occasion to examine urinary sediments, or who are called upon to teach others to recognise their various constituents, this English edition of Dr. Rieder's recently published atlas cannot fail to be of great service. With few exceptions, all the deposits met with in urine are represented in the thirty-six quarto plates which the volume contains. The figures are admirably drawn from nature, and accurately represent the objects portrayed. In the numerous coloured figures the tints of the originals are correctly reproduced. The scale is as far as possible uniform, and the specimens are represented as seen under a moderately high power (Zeiss, objective D, with No. 2 eyepiece). In the case of the commoner crystalline sediments, not only the more typical forms are shown, but also many of the aberrant forms which are frequently met with, but are less easily recognised, and thus the value of the atlas as a work of reference is greatly enhanced. Among the organised sediments figured are the various forms of epithelial cells, derived from different portions of the genito-urinary tract, the varieties of renal casts, red and white blood corpuscles, moulds, and bacteria. In the later plates the sediments present in cases of various urinary diseases are represented. One of the figures shows the appearances presented by included air bubbles, and among accidental contaminations grains of wheat-starch are included. Starch from various sources is so commonly employed in dusting powders, and is so often mistaken by students for true urinary sediments, that drawings of some of the other varieties, such as maize and rice starch, would have been useful.

In the letterpress, which extends over ninety-nine pages (in addition to descriptions of the individual figures), we have a very complete account of the various sediments and of their clinical significance. This portion of the work gains much in value from the editorial notes of Professor Delépine, which are for the most part eminently practical, and are based upon his own wide experience in these investigations. In some places, in which the views expressed by the author are at variance with those usually held, the editor has called attention to the fact in notes, in which the prevalent views are stated and discussed.

In the section on indigo the spontaneous deposition of that substance in urine is ascribed to a transformation of the so-called indican (indoxylsulphate of potassium), but there is good reason to believe that the substance which actually undergoes this change is the less stable indoxylglycuronic acid. Again, exception must be taken to the author's statement (on p. 34) that urate sediments are variously coloured by uro-erythrin and urobilin. It can easily be shown that urobilin takes no part in the pigmentation either of urate sediments or of uric acid crystals. In the section devoted to the tubercle bacillus, we do not find any reference to the very useful carbolic acid method for its separation from, and detection in, urine. These, however, are minor points.

Among the editorial contributions is a new and useful chapter on the preparation of permanent specimens of urinary sediments. This will prove of special service to those engaged in teaching.

A short bibliography of works bearing upon the subject is appended, and a full and satisfactory index concludes the volume, which can be confidently recommended to all workers in the field of clinical pathology. ARCHIBALD E. GARROD.

The Diseases of the Stomach. By WILLIAM W. VAN VALZAH, A.M., M.D.; and J. DOUGLAS NISBET, A.B., M.D. London: Rebman Publishing Co., Ltd. 1899.

STILL another treatise upon the diseases of man's gastric organ; but a very good one, and by no means superfluous. One tendency which may be observed to be almost pathognomonic of those who devote especial attention to gastric disorders is apparent in this volume; that is, an intense love for the introduction of a new nomenclature. Perhaps the authors of this text-book have not quite so much to pay penance for, but we notice the use of gastrospasm, gastroplegia, parorexia, adeno-hypersthenia gastrica, and paroxysmal hyperchylia gastrica, terms which are as caviare to most of us. It is a misfortune that the present official nomenclature of gastric conditions is so vague; it is more than a misfortune that every text-book upon these conditions so varies the classification and nomenclature that it is almost like to the labour of Sisyphus to correlate them.

A very clear description of the most pregnant facts which require to be drawn from the patient's personal history, of the various physical signs requiring recognition, a lucid general, rather than particular, review of the different methods for the chemical and physical analysis of the gastric contents, accompanied by practical comments as to their value and significance, and notes of the bacteriological and anatomical signs which may be investigated, form the first regular section of the work. The next section is devoted to medication, going fully into the scientific aspect of the nutritive value of foods, as well as the results obtained from them clinically. The thoroughness with which this part of the subject is treated may be grasped, if it be stated that digestive hygiene, diet, physical remedies, symptomatic, physiological, bacteriological, and chemical treatment are accorded separate chapters. We notice that the antiseptic treatment of gastric fermentation is strongly denounced, prevention of access of germs, diet, and lavage being insisted on. These measures undoubtedly are very successful and advisable, but the antiseptic properties of hydrochloric acid might allow its administration to come under this heading, and assuredly merit very considerable commendation.

On entering on a description of gastric diseases proper, the authors separate the various forms into—(1) Dynamic, (2) anatomical affections, and (3) vicious circles of the stomach. The strict division into dynamic and anatomical affections is a species of opportunism, and certainly gains by simplicity. But students will meet the difficulty of the subject as to when the dynamic ceases and the anatomical begins—how far the first is due to the second, or the second to the first. In the "dynamic" types of disease no visible lesion of the mucosa may be discernible, but in many, if not most, a lesion must exist elsewhere. If not, and if solely due to functional nervous causes, affections such as myasthenia with stagnation can hardly claim to be dynamic cousins of spasmodic closure of the cardia, or of bulimia. Myasthenia with stagnation generally implies chronic dilatation; chronic dilatation implies anatomical changes in the stomach walls. Again, to quote from the introduction, "It is also a mistake to ascribe all the dynamic affections of the stomach to 'neuroses.' Some of these troubles are purely muscular." Now, it is a very fine point to differentiate muscular affections into those which are dynamic and into those with anatomical lesions, or to say how far muscular troubles are purely muscular (an almost untenable thesis), or are dependent upon nervous influences caused by functional or physical disturbances. Dilatation of the stomach is not regarded as an individual clinical entity, it is referred to as a symptom. It would be a matter of some difficulty to classify properly the cases of acute gastric dilatation, which have been recorded, in the light of a purely symptomatic lesion, accompanying some underlying dynamic cause. Motor insufficiency, it appears to us, covers but insufficiently the majority of cases of gastrectasis which occur, apart from stenosis or spasm of the pylorus; in many such the peristaltic power is normal, but a dilatation renders it insufficient, not a deficient power, the dilatation.

Notwithstanding, the treatise is well worth study, especially to the practitioner, and is made all the more valuable by the inclusion of a section devoted to a consideration of the relations between stomach conditions and those of other organs, an aspect of the subject far too often overlooked. Dyspepsia itself, whatever its type may be, is very often only a reflexly-induced condition, arising primarily from faults in other organs, or from metabolic failings, and secondarily aggravating its original cause, which in turn aggravates it. The vicious circles should be carefully studied, in the last section of this volume.

A. Lockhart Gillespie.

The Wasting Diseases of Infants and Children. By Eustace Smith, M.D., F.R.C.P. Sixth Edition. London: J. & A. Churchill. 1899.

We are glad that Dr. Eustace Smith has found time to revise and issue another edition of this excellent little book. An interval of ten years has elapsed since the publication of the fifth edition, and during a considerable portion of that time the volume has been out of print.

The conditions which the author has selected for consideration are atrophy, rickets, inherited syphilis, abdominal and pulmonary tuberculosis, and lastly mucous disease, a subject which the writer has made peculiarly his own, and of which a most interesting account is given. These various diseases are treated entirely from a clinical standpoint, and the different methods in which they induce chronic interference with nutrition are discussed in an elaborate manner, whilst attention is repeatedly directed to the difficulty of interpreting aright and estimating at their true value the early symptoms of these conditions. That this difficulty is no imaginary one, will be readily admitted by those readers whose previous experience and practice has been confined to the study and treatment of adult patients. There can be no question that Dr. Smith has fulfilled the difficult task he has set himself to accomplish in a masterly style. Every page bears the imprint of original investigation and observation. No symptom is regarded as too trivial for careful consideration; no point is omitted, and nothing overlooked, which can serve to make the clinical picture a graphic and striking one. The sections devoted to treatment are admirable, full of practical hints, and of shrewd, wise suggestions for the guidance of the practitioner. A carefully arranged dietary closes a book which should be read, studied, and inwardly digested by all who are called upon to undertake the care of sick children.

G. H. Melville Dunlop.

Aids to the Diagnosis and Treatment of Diseases of Children. By John M'Caw, M.D., L.R.C.P. Second Edition. London: Baillière, Tindall, & Cox. 1899.

It is very questionable whether the publication of this short treatise serves any useful purpose. The book lays claim to no originality, the author freely admitting in his preface that it is merely a compilation from other well-known text-books. There are already so many standard works on the subject that the present short and somewhat hastily put together volume is absolutely valueless in comparison as a work of reference for the practitioner; while the student, we imagine, will find difficulty in absorbing the heterogeneous mass of facts which it contains, devoid of connecting links or clinical cases to fix them on his memory. At best it is a mere outline of the subject; although the main symptoms of the diseases sketched are accurately enough described, and the faults are rather those of omission than of commission. The system which the writer adopts, of contrasting the diagnosis of the different diseases in a tabular form, has much to recommend it.

G. H. Melville Dunlop.

The Radical Cure of Hernia, Hydrocele, and Varicocele. By Charles Barrett Lockwood, F.R.C.S. Edinburgh and London: Young J. Pentland. 1898.

In these pages we have not merely a collection of other people's views and methods of practice, but a strong case made out for certain lines of treatment, that are based upon an extensive and accurate knowledge of the anatomy and pathology of the subjects treated. The great charm and merit of the work lies in its individuality, and moreover what is new carries conviction, not only from the author's mode of exposition and his results, but mainly from the sound stratum of facts on which his reasoning is based. The greater part of the book is devoted to hernia, and special attention should be paid to the chapters on this subject that refer to classification, and the indications for a selection of cases suitable for operation. These are eminently practical, and are based not only upon a knowledge of the local conditions, but also upon a proper appreciation of the general pathological changes that take place in the abdominal walls, and in the attachments of the viscera. The importance of this wider aspect of the case is clearly shown by the author in respect to his class of acquired herniæ. The operative procedure that is adopted for the radical cure of hernia is in the main that of Bassini. Some interesting points are raised in regard to the complication of undescended testicle and its transplantation to the scrotum. The author notes that in one case an imperfectly descended organ transplanted to the scrotum has certainly grown larger. If it can be shown that after transplantation the testicle becomes functionally active, as regards spermatogenesis, the operation will be placed on an altogether different footing to that which it occupies at present. The importance, consequently, of any observations bearing on this question can scarcely be exaggerated. Mr. Lockwood is carefully watching these cases, and we hope we may before long have some communication from him upon a subject of so much interest, and about which we have at present but little knowledge. In the treatment of hydrocele, attention is drawn to the comparatively large number of failures that follow the injection of iodine, and some very instructive figures are given. Besides being an uncertain procedure, the author considers that it leads to orchitis in a certain proportion of cases. A noticeable feature throughout the book is the ready adaptation of recent advances in many branches of knowledge to the practical treatment of the subjects considered. We have little doubt that this volume of Mr. Lockwood's will be as cordially received, as was the preceding one on Aseptic Surgery.

G. Bellingham Smith.

Aseptic Surgery. By Charles Barrett Lockwood, F.R.C.S. Second Edition. Edinburgh and London: Young J. Pentland. 1899.

This book of Mr. Lockwood's is now so well known, that we need do little more than call attention to the fact that he has given us a second edition. The main features of the book are the care with which the technical details in the practice of aseptic surgery are described, and the clear description of the principles on which the details are based. The treatment of this subject is the natural one, an account of the principles of asepsis being followed by a short but useful account of the ordinary pathogenic organisms. This leads to the subject of the different sources and modes of infection, stress being very rightly laid on the great importance of that by contact. Chapters then follow on the methods of disinfection, and the application of the knowledge thus gained to the exclusion of organisms from wounds. The book is throughout an exposition of the author's own practice, and as the result of his own experience presents all the advantages that belong to a personal statement. As a guide to those inexperienced in this subject, this method is to be regarded as more satisfactory than one which aims at completeness, by giving a variety of different methods often contradictory and consequently confusing. On the subject of sponges, however, the author might have stepped for a moment outside his own practice, and devoted a little more attention to some of the substitutes that have so largely taken their place. The book is admirably clear and detailed as regards all points of technique, and no safer and better guide to the principles and practice of aseptic surgery can be recommended.

G. BELLINGHAM SMITH.

A Handbook of Anatomy for Art Students. By ARTHUR THOMSON, M.A., M.B., Professor of Human Anatomy in the University of Oxford; and Lecturer on Anatomy in the Royal College of Art, South Kensington. Second Edition. Oxford: The University Press. 1899.

THAT the favourable reception accorded to this work on its first appearance has been fully endorsed by those for whom it was primarily intended, is evidenced by the fact that it is now in its second edition, an edition which is in no way inferior to the beauty of its predecessor, or to that high artistic standard which may with confidence be expected from its author.

We have heard it objected by those for whom the present work was written—students of art—that it errs on the long side, a criticism with which we cannot agree, as, even assuming such a view to be correct, the extreme beauty of the illustrations, and the clearness and lucidity of the diction, entirely dissipate any erroneous notions of undue length. But such a view is not correct; the book is not one whit too long; it clearly demonstrates the outlines and curves of the body and their causes, thus enabling a student of art to take an intelligent interest in the why and the wherefore of his lights and shades, of his outlines and curves. But over and beyond this a second reading of this work in its latest edition has still further strengthened our opinion that it is essentially a work to be studied by anatomists themselves. A knowledge of its contents will enable the teacher to clothe his dry-as-dust and eternal "origins" and "insertions" with some degree of utility and even of interest.

Whilst anatomists will experience no difficulty in assigning the various eminences and depressions depicted in the plates to their respective causes, we do not think, even with the aid of the keys which accompany the numerous beautiful illustrations of the surface anatomy of the athlete, that the student of art will experience the same want of difficulty, hence we consider this a slight defect. This point is more in evidence in some of the plates than in others, but in any case it is of perhaps hardly sufficient importance for the critic to carp at. The fact remains that this work is a credit to the well-known artistic tastes of its author, and a welcome addition to the library of the skilled anatomist, and to the art student of the human form.

RICHARD J. A. BERRY.

Bacterial Treatment of Crude Sewage—Second Report to the County Council of London. London: P. S. King and Son.

This report is the conjoint production of Professor Frank Clowes and Dr. A. C. Houston, and contains an account of much interesting work of an experimental nature.

The method depends on the aërobic action of microbes on sewage matter. The sewage, after being roughly screened, is run into a filter-bed of 4 or 6 ft. in depth, and filled with pieces of coke about the size of a walnut. It is retained here for about three hours, and then slowly run off either directly or on to another similar filter-bed called the secondary bed. To insure the thorough aeration of the coke, eight hours is allowed to elapse before the next charge of sewage.

In the first division of the report is given the amount of purification effected, as determined by an extended series of chemical analyses. The amount of dissolved organic matter is expressed in terms of the oxygen required to oxidise it, and is estimated by acid permanganate solution at 80° F. Dr. Clowes states "that this method is not appreciably affected by the small amount of nitrite which is occasionally present in the effluent," still it is permissible to doubt if this method be the most satisfactory that might have been used. While chemical treatment of the sewage only removes 17 per cent. of the organic matter determined in this way, a simple treatment on the coke bed removes 51·3 per cent., and a double treatment 69·2 per cent.

In the second division Dr. Houston gives the result of the bacteriological work in some detail. Though there is 27·7 per cent. removal of micro-organisms, the effluent still contains on an average more than 400 millions per c.c. While liquefying bacteria are reduced by 11·3 per cent., there is no reduction in the number of *Bacillus coli* and *B. enteritidis*. A detailed account is given of the bacteriological characters of several organisms found in sewage, and this will be found valuable to workers in the same field. In many cases the want of such details has resulted in the same microbe being described under different names.

The limits of the applicability of this method of sewage treatment are frankly stated. The effluent has no smell, and is harmless to fish life, but the amount of organic matter present in it, and its richness in micro-organisms, some of them probably pathogenic in character, makes it quite unsuitable for discharge into an ordinary river. The method seems not only sufficient but practicable for purifying the sewage of London to such an extent as will prevent deposit of sewage sludge in the estuary of the Thames below the outfall.

C. Hunter Stewart.

Ringworm and some other Scalp Affections, their Cause and Cure. By Haydn Brown, L.R.C.P. & S., Edin. London: J. & A. Churchill. 1899.

After a perusal of Mr. Haydn Brown's book, one is quite at a loss to account for its production, not to say its publication. It is hard to decide whether one is to take him as writing *au sérieux* or whether he means to perpetrate in its pages a joke at the expense of his medical brethren. The gist of the contents of one hundred and seventy-five pages may be summed up in the following quotation:—"At the present moment I look upon the treatment of the general health to be by far the most important point to attend to in cases of ringworm, alopecia areata, favus, impetigo, tinea versicolor, and pediculi capitis. These affections to me are no longer specific; they are significant and pathognomonic of what I shall choose to call a fungus or mould dyscrasia; they are signs of ill health." Yet in reading the volume one seems to be in the position of the child who has been told to look for the pot of gold at the extremity of the rainbow. Time after time it is held out to the reader that the cause and cure of the above-named diseases are to be explained and illustrated by cases, but we wait in vain for the explanation. The work has no claim, no pretension even to be regarded as scientific. Mr. Brown says: "I have never myself *possessed* a pair of epilatory forceps; I have never owned a lens for examining ringworm." It exhibits an excellent example of arguing in a circle. It is the old dartrous diathesis redivivus. At the end we are still in the dark as to the nature of the wonderful dyscrasia, and the cure consists of the administration of the syr. ferri phos. co. of the very best quality, said to be a specific for fungus dyscrasia, in conjunction with an adequate régime for each case. Locally, a little ung. hydrarg. amm., but not much stress is placed on this. One case is cited which Mr. Brown saw on a single occasion, but was told it got well. Comment is unnecessary.

W. ALLAN JAMIESON.

An Introducton to Dermatology. By NORMAN WALKER, M.D. Bristol: John Wright & Co.

THIS handy volume is practically a reproduction of Dr. Norman Walker's lectures at the Edinburgh Royal Infirmary. Most of the well-known skin diseases, with the exception of eczema, are illustrated by chromo-plates, and the histology of twenty-five important diseases is represented pictorially. The author is an interpreter of Unna. Unna's influence can be traced in this volume like a coloured thread woven through a texture of neutral tint. The book is full of interest. Its good sense abounds everywhere. The style is free, easy, and colloquial. The author's honesty is delightful. We have no cloaking of ignorance under mystifying words, we are not taken through the mazes of the diathesist, of the neurologist, or of the psycho-physiologist. One specially good feature of the book is the attention paid to treatment. Treatment is *the* feature of Dr. Walker's book.

As to pathology, it is simply Unna. Here we are, consequently, much in advance of the times. It may turn out all right in the end. But we British are a slow-going people, with a weakness for logic and evidence. It is a misfortune, doubtless, for our progress is likely to be slow. We certainly cannot keep up with those who spin theories out of nothing. Dr. Walker's good Scotch sense saves him on the brink of many a logical absurdity. He tries hard to believe that the morococcus is the *causa una* of eczema, but is obliged to confess that his recalcitrant fellow-specialists have some reason for their obstinacy. The identity of psoriasis is treated somewhat cavalierly. This ancient entity, we are told on the authority of Unna, has ceased to be. It has fallen into the group of the seborrhœas, and is only an extremely dry type of seborrhœic eczema. We have no objection to so delightfully simple a theory. All we want is to be treated to a little evidence, like intelligent beings. The new view is bad for the morococcus, since Sabouraud has shown that the scales of psoriasis are bacteriologically sterile. If seborrhœa eczema is always the work of the morococcus, and psoriasis is a variety of seborrhœic eczema, psoriasis ought therefore to be a morococcic process. Perhaps our logic is at fault.

Rosacea, we are told, is essentially a seborrhœic dermatitis; "the real cause of nineteen out of twenty cases of rosacea is seborrhœa of the scalp, the disease being produced by the deposit on it of the scales and organisms (?) of seborrhœa." We may ask, what about the 999 cases of scurfy heads that develop no rosacea? One cannot help admiring the elasticity of this process, "seborrhœa," which covers so great a number of pathological faults. The irony of the thing is that the most advanced French and German investigators hold radically different views as to what seborrhœa is. It is a little premature to teach dogmatically to young students that rosacea is simply a manifestation of seborrhœa. Unna has not had the last word here.

The author's description of rodent ulcer is very clear and precise, and bears the stamp of independent investigation. Due prominence is given to the great subject of inflammation, which, after Unna, he divides into traumatic, neurotic, and infectious. It is to be regretted that Dr. Walker does not say "infective." We always understood that the contagion of infectious diseases is conveyed *viâ* the atmosphere. Eczema is essentially an infective disease, although most authorities are agreed that it is non-contagious. The perusal of this book is a delight to those who find something in diseases of the skin worthy of study. It cannot fail to train the young idea to shoot into practical fruition. It supplants nothing, for it does not aspire to rival the larger books. We heartily congratulate the author, and wish for his book a prosperous career.

Leslie Roberts.

Report on Prison Dietaries. By J. C. Dunlop, M.D.
London: Eyre & Spottiswoode. 1899.

This report embodies the results of an inquiry into prison dietaries, instituted by the Prison Commissioners for Scotland, carried out by Dr. Dunlop, and presented as a blue-book to Parliament. It extends to 134 pages, and besides giving a full account of the diets at present in use, contains the results of a number of independent analyses made by the author, estimations of the value of the daily food of all classes of prisoners, and valuable suggestions for modifying the routine in the direction of an increase in nutritive capacity without materially adding to the expense. It starts on the assumption that, as regards the *amount* of nutriment provided, the ordinary prison dietary is in no sense penal, and that the prisoner is to be restored to liberty at the end of his term in as good bodily health, weight, and condition as he was at the beginning. In carrying out the inquiry, Dr. Dunlop has shown a wide and accurate knowledge of the principles of dietetics and their application to the feeding of large bodies of men, the result being a valuable contribution of scientific and practical importance. The dietaries were originally constructed on the theory that they should at least not be superior to what is customary among the poorer class of labourers, and that they should not constitute a temptation for loafers and beggars to commit minor offences and so enjoy a period of repose and good feeding at their country's expense. In process of time, however, more humane views with regard to general prison treatment have gradually gained ground, and apart from this, some of the dietaries have been found deficient in variety as well as in nutritional value. Dr. Dunlop has given attention to these points specially, and has made certain simple but well thought out suggestions for their improvement.

After a careful résumé of our knowledge and experience, he comes to the conclusion that for the ordinary male prisoner a diet containing daily 120 grms. proteids, 550 grms. carbo-hydrates, and 38 grms. fat, giving 3100 calories, may be taken as the normal. But the matter is not so simple when it is considered that there are many classes of prisoners — women, nursing-women, juveniles, the idle, convicts on hard labour, long sentence ordinary prisoners, criminal lunatics, and the sick—all of whose requirements have to be taken into account. In the report, the special circumstances of all these classes have been carefully gone into, with the result that a series of diets are tabulated, varying in value from 1850 calories (punishment diet) to 3500 calories (male convicts on hard labour). The shortcomings of the present scale are also discussed at length. This has involved a large number of analyses and a great amount of experimental work, including the examination of many samples of the food supplied to our prisons. The important questions of monotony and waste have also been gone into. A most interesting part of the inquiry consists in experimental observations on the metabolism of prisoners with a view to ascertain if their nitrogenous equilibrium is maintained on the food provided. The three methods of investigation adopted, namely, the comparison of the food value of the diets with a theoretical standard, the study of the nitrogenous balance, and the study of the variation in weight of prisoners, have given concordant results, and from these it has been possible to draw certain definite conclusions regarding the dietary scales at present in use. Some of these come out as barely sufficient, others as sufficient. For each class of prisoners all these points are gone into carefully and critically, and the conclusion is stated. It is put into more concrete form by a series of tables giving the proposed dietaries in detail. At a first glance these do not look tempting, but comparison shows that they are a distinct advance, both in variety and nutritive value, on the dietaries which they are proposed to replace. An appendix contains a summarised report on the diets in vogue in English, Irish, French, and German prisons. For sick prisoners the author strongly recommends that the food be left, as at present, in the discretion of the medical officer.

Such an investigation as this, brought to a successful conclusion, represents a vast amount of labour, of previous work, and knowledge both of methods and principles, and the author is to be heartily congratulated on the result. RALPH STOCKMAN.

Modern Cremation. By Sir HENRY THOMPSON, Bart., F.R.C.S. Third Edition. London: Smith, Elder & Co. 1899.

THE efforts of Sir Henry Thompson on behalf of a more rational method of disposing of the dead by means of cremation are well known, and the progress which has been made to this end throughout the country is largely due to his writings. The present volume is the third edition of his well-known work, which lays before the public in a thoroughly clear and forcible style the arguments in favour of cremation.

He does not shirk dealing with the objections which have been urged against the proposal, but, with the exception of the medico-legal objection—that cremation would tend in some instances to defeat the ends of justice—there are none which in the present day can be held to have much validity. The author rightly points out that with a better system of death certification—a want generally recognised by the medical profession of the country—the objection to cremation, on medico-legal grounds, loses much of the importance which has hitherto been attached to it. Apart from a few cases, where there might possibly be some uncertainty as to the cause of death, there is a very large number of bodies every year in which the cause of death is clearly made out, and which, upon public and sanitary grounds, had infinitely better be destroyed by fire than allowed to rot in soil adjacent to populous communities.

Sir Henry Thompson's book should be read by everyone, and it is to be hoped that the authorities in the large towns throughout the country will follow the recent example of Hull, and provide public crematoria where the dead can be disposed of decently and reverently and yet with a proper regard to the public health.

HARVEY LITTLEJOHN.

Orthopædic Surgery: A Text-Book of the Pathology and Treatment of Deformities. By J. JACKSON CLARKE, M.B., F.R.C.S. London: Cassell & Co. Limited. 1899.

IT can no longer be said of orthopædic surgery that it is not sufficiently represented in our literature. One good book after another has appeared, and has received its own share of appreciation. While it is unwise to institute comparisons, we are inclined to favour the present work, because its scope is not too extensive, nor is it over-burdened with unnecessary details. It is written concisely and well, and it is extremely well illustrated. It not only bears the imprint of the author's own experience, which would appear to be considerable, but it shows also a familiarity with the work of others, which is eminently desirable. The average graduate is little versed in orthopædic surgery: we strongly recommend him to study Mr. Clarke's excellent text-book.

ALEXIS THOMSON.

RECENT ADVANCES IN MEDICAL SCIENCE.

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MEDICINE.

UNDER THE CHARGE OF

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Enterogenous Albumosuria, and the Tests for Albumoses in the Urine.

Aldor (*Berl. klin. Wchnschr.*, 1899, Nos. 34–36) discusses very fully and exhaustively these questions in a communication originally delivered before the Society for "Innere Medicin" last January.

First, as regards the incidence of albumosuria. Out of fifty-three cases of various characters, eighteen showed the presence of albumose in distinct amounts in the urine, three of a trace only—twenty-one in all, or 39·6 per cent. of the whole. In twenty of the cases there was some rise of temperature, and of these sixteen, or 80 per cent., had albumosuria. The five cases in which albumose appeared in the urine, apart from any rise of temperature, comprised four instances of gastric and one of peritoneal carcinoma. It is of interest to note that these five constituted the whole number of cancerous affections, and that all of them showed the presence of albumosuria. Of ten phthisis patients, five; among seven examples of acute rheumatism, five also showed the same; six nerve lesions yielded one; eight acute infective disorders four (erysipelas two, influenza and scarlet fever each one); the remaining case occurred along with lobar pneumonia.

No further details are given, rather unfortunately, but the results of the investigation into these fifty-three lead Aldor to separate them into two classes, namely—(1) A histogenic form, exemplified by the five cases of cancer affecting the digestive tract; and (2) a febrile type. The examples of the first class as met by him can hardly be termed enterogenous, in the sense of the term as used by Maixner, Chvostek, and Stromayer, in which the appearance of albumose in the urine is regarded as due to actual local changes in the intestinal mucous membranes, leading to inefficient transformation of the absorbed proceeds of proteid digestion into higher forms, such as should normally take place, the consequent presence of lower bodies in the blood, and their excretion by the kidney. It is significant that in the one case of dysentery investigated among the others no albumose could be detected, nor did even a trace obtain at any time during the ten hours which followed ingestion of as much as 30 grms. (463 grs.) of albumose by the mouth. Again, when similar amounts of albumose were taken by two of the patients suffering from carcinoma of the stomach, and showing beforehand the signs of albumosuria, no evidence of any alteration in the amounts excreted was obtainable.

Both these observations militate strongly against the theory of the enterogenous origin of albumosuria. In dysentery the walls of the bowel are presumably in exactly such a condition as should facilitate the passage of the more hydrated proteids into the blood-stream unchanged, and if in cancer cases this passage be to blame, how is it that increased intake of these bodies, already prepared, has no effects on the amounts present in the urine?

Febrile albumosuria occurs not because of the fever, but because of metabolic anomalies. It is at least not improbable that albumosuria is always associated with excessive proteid disintegration in the body. Fever, acute yellow atrophy of the liver, cancer, and suppurative diseases, especially of bony tissues, are all as a rule accompanied by increased proteid waste, and are known to be frequently associated with the presence of albumose in the renal excretion.

As to the method of estimating the amount of albumose, as well as for its actual presence in the urine, Aldor recommends the acidifying of from 6 to 10 c.c. with one or two drops of hydrochloric acid, adding a 5 per cent. phospho-wolframic acid solution to this, until no further precipitate is caused; then, after centrifugalising, the consistent deposit (the supernatant fluid having been poured off) is strongly shaken with some absolute alcohol. The alcoholic mixture is now centrifugalised, when the upper part will be found tinged wilh urobilin, etc., the lower portion to contain a solid precipitate. This treatment with alcohol must be repeated until the upper part is free from colour. The sediment then, after pouring off the final alcohol used, is suspended in water, concentrated caustic soda added, the blue colour caused is removed by shaking up in a flask with air, and, lastly, sulphate of copper solution added to the colourless mixture, when the presence of albumose can be determined by the appearance of a red-violet tint, its proportion, by the intensity of the colour produced. If albumins are also present, they must be removed from the urine before the application of this test, and best by means of trichloracetic acid.

URÆMIA AND CHLORIDE OF SODIUM.

BOHNE, in 1897, suggested that uræmic conditions are accompanied by diminution in the amount of chloride of sodium excreted in the urine. Hofmann (*Deutsches Arch. f. klin. Med.*, Leipzig, Bd. lxi., Hefte 5 and 6) directly controverts this statement. In six cases of chronic, and two of acute nephritis, he found no alteration in the quantity of chloride of sodium in the urine before and after the appearance of uræmic symptoms, except indeed an increased excretion of the salt in some of the cases. *Per contra*, he observed retention of the chloride in some cases of chronic nephritis in which no uræmic symptoms occurred. In these instances no variations in the excretion of phosphoric acid in the urine could be detected.

Phloridzin Glycosuria and the Clinical Examination of Renal Functions.

Delamare (*Gaz. d. hôp.*, Paris, 28th October 1899) has before now published communications upon this subject in conjunction with Achard. His present article reviews very fully all that has been written about phloridzin in medical literature up to the present time, and describes the composition and method of action of the substance, following up these sections of the subject with an exposition of how it may be made use of in clinical diagnosis.

Phloridzin, as shown by v. Mering, Minskowski, Coolen, and others, ingested or injected, produces temporary glycosuria through a direct action on the kidney, or rather by its action on some organ or system of the body, for various theories have been severally supported as to the mechanism involved; the pancreas, liver, nervous centre of Claud Bernard for diabetes, and the kidney itself, have in turn been identified with the phenomenon. Delamare inclines to the renal theory, and to that brought forward by Lavene in contradistinction to that of many German observers, namely, the elaboration of sugar in the kidney rather than simple elimination from the blood and lymph.

In healthy persons, in whatever manner the drug acts, a dose of 5 grms. of phloridzin, hypodermically, causes glucose to appear in the urine in from half to one hour, and to last for three or four hours. The total quantity of sugar excreted usually equals 1 to 2 grms. If, however, the kidneys be diseased, the glycosuria varies in amount and duration. Its use affords very similar information as to renal insufficiency and functional disturbance as methylene blue (see "Recent Advances in Medicine" in this Journal, June 1898), but as its action is more complex the results do not always tally. Most cases of acute and chronic nephritis exhibit diminution, not a few complete absence, of sugar in the urine after phloridzin. A minority of such cases excrete more than the average in healthy persons.

Variations in the amount of sugar induced, or in the length of time occupied in its excretion, almost always imply some grave organic kidney lesion, which can gênerally be determined by the presence of other signs, or some functional renal disturbance, which may give rise to no material sign, and which may be of little or of great importance in the conduct of individual cases.

Acromegaly with Alimentary Glycosuria, Paroxysmal Hæmoglobinuria, and Swellings of Joints.

Chvostek (*Wien. klin. Wchnschr.*, November 2, 1899) details the history of a patient showing the above conjunction of symptoms, using it as a text on which to base a consideration of the symptomatology and etiology of acromegalic conditions.

The patient was a male, æt. 37, who first sought advice for an attack of hæmoglobinuria, when he presented the appearance of acromegaly in his large hands and typical shape of face. While under observation, attacks of hæmoglobinuria could be readily induced by exposure to cold, and, later on, examination of the urine passed in the afternoons detected glucose. The amount of sugar was unaffected by farinaceous foods, but increased by even small quantities of sweet foods and sweet wine. A year after he was first seen, on the approach of cold weather, he began to be troubled by sudden swelling of one large joint after another. The swellings were painless, unaccompanied by fever, and severally disappeared in from two to three weeks' time. At this period the paroxysmal hæmoglobinuria and the alimentary glycosuria had ceased.

Chvostek then sums up the lessons of the case—the presence of alimentary glycosuria, the paroxysmal excretion of blood pigment in the urine, and the sudden attacks of hydrops articulorum, are all assigned to vasomotor disturbances, causing changes in the blood vessels locally. The primary factor in producing these changes he is inclined to regard as the hypophysis cerebri, thereby bringing their etiology into line with that of acromegaly. In this connection he quotes Cyon's conclusion, that the pituitary body exercises an influence upon the circulatory nerve apparatus, similar to that of the thyroid, and also possesses a blood pressure regulating mechanism.

SURGERY.

UNDER THE CHARGE OF

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THE TREATMENT OF NECROSIS FOLLOWING ACUTE OSTEOMYELITIS.

Dr. Cushing of Boston, in a paper on this subject, makes suggestions as to treatment which are worthy of further consideration. His main contention is that the most favourable time for the removal of the dead shaft is when the periosteum and granulation tissue are in their most active regenerative stage, and before the sequestrum has become enveloped by a compact shell of new bone. He believes that this stage is to be determined by frequent examination of sections of the periosteum with the microscope. It is shown by the presence of numerous fibroblasts, osteoblasts, and small trabeculæ in which lime-salts are beginning to be deposited. Clinically it can be recognised by the slight crackling sensation as the periosteum is incised, due, probably, to the crushing of the trabeculæ by the knife. This stage is probably reached in the seventh to the eighth week of the disease. The dead bone should then be removed, and the remaining periosteal sheath should be closed by suture, leaving a solid cord or mass of periosteum buried in the centre of the limb, when in its most active bone-producing condition. Asepsis is of the first importance. If the operation be done at an earlier stage, the growing periosteum is injured and its growth interfered with; if too late, a rigid bony involucrum makes the removal of the sequestrum more difficult, and leaves a cavity which is very difficult to close. The author describes a case successfully treated on the principles indicated, and shows by means of skiagraphs that the entire shaft of the tibia was completely restored.—*Ann. Surg.*, Phila., October 1899.

COCAINISATION OF THE SPINAL CORD.

SELDOWITSCH of St. Petersburg records a series of four cases in which he adopted Bier's method of anæsthetising the lower limbs by injecting cocaine into the spinal canal. The needle of the syringe is introduced between the third and fourth lumbar vertebræ; as soon as the cerebro-spinal fluid appears, the syringe is fixed to the needle and the piston is driven home. No cerebro-spinal fluid is lost. The cocaine injected amounted to $\frac{1}{100}$ grm. Within eight minutes the limbs become insensitive as high as the iliac crest, and remain so for thirty to sixty minutes. The operations performed included Pirogoff's amputation, amputation of the leg and removal of malignant femoral glands, excision of the knee, etc. There were evanescent symptoms of cocaine poisoning in most of the cases.—*Centralbl. f. Chir.*, Leipzig, 14th October 1899.

THE OPERATIVE TREATMENT OF ARTHRITIS DEFORMANS.

AKERMANN of Stockholm, in writing on this subject, refers to the necessity of defining what is meant by arthritis deformans. One must first exclude tubercular, syphilitic, gonorrhœal, septic, neuropathic, and gouty arthritis. There still remain chronic rheumatism and arthritis deformans, of which the former represents a clinical diagnosis and the latter a pathologico-anatomical result. He recommends the restriction of the term, chronic articular rheumatism, to cases in which there exists some obvious connection with acute or subacute rheumatism. Including those operated upon by the author himself, he has collected forty-eight cases of arthritis deformans, subjected to operation (chiefly excision)—hip, fourteen; knee, nineteen; shoulder, five; elbow, seven; and wrist, three. In a certain proportion of these cases, a very satisfactory result was obtained. It is therefore recommended to have recourse to operative interference in cases in which conservative measures have failed and in which there is no contra-indication, such as the age of the patient, depraved general health, or the polyarticular character of the malady. The abstractor can fully bear out the author's contention, for he has operated in several cases of arthritis deformans of the knee with decided and permanent benefit.—*Centralbl. f. Chir.*, Leipzig, 7th October 1899.

INTERSCAPULO-THORACIC AMPUTATION.

LE COUTE of Philadelphia relates a successful case of this operation for sarcoma of the shoulder, in which he modified the usual procedure with considerable advantage. Instead of resecting the middle third of the clavicle in order to obtain access to the subclavian vessels, he disarticulated the bone at its sternal end, and displaced it bodily outwards and upwards. The structures passing to the axilla are thereby fully exposed, and the accidents and difficulties in ligaturing the main vessels are reduced to a minimum. After tying the artery, the limb is elevated to empty it of blood before the vein is tied; the operation is practically bloodless.—*Ann. Surg.*, Phila., September 1899.

REMOVAL OF THE INNOMINATE BONE AND LOWER EXTREMITY.

SSALISTSCHEW describes a successful case of this operation which he calls "exarticulatio interileo-abdominalis." It may be carried out in two ways. Jaboulay's method consists in dividing the symphysis pubis and tying the common iliac vessels; in all of the four cases in which it has been practised the patient succumbed. The method of Girard and Bardenheuer consists in tying the external and internal iliac arteries, and in leaving the bone internal to the thyroid foramen.

The author adopted Jaboulay's method, with certain modifications; the patient, a male, æt. 38, had suffered for two years from sarcoma of the right half of the pelvis, extending upwards to the umbilicus and downwards into the thigh; he suffered from very severe pain; the branches of the common iliac artery and the lower half of the psoas muscle were involved by the tumour.

The operation was performed on the 8th December 1898. The first incision was made from the free extremity of the last rib to the anterior superior iliac spine, and then along Poupart's ligament to the spine of the pubes; the soft parts were divided down to the peritoneum; the common iliac artery was ligatured 3 cms. below its origin from the aorta; an oval posterior flap was then formed by an incision starting from the spine of the pubes along the fold between the perineum and thigh to the tuber ischii, then curving round behind the great trochanter to the middle of the crest of the ileum, where it joined the first incision. After separating the soft parts, the symphysis pubis was divided, as were also the psoas muscle, the anterior crural nerve, the obturator vessels and nerve, and the sacral plexus. The sacro-iliac ligaments were then divided and the extremity removed. The bleeding was moderate. The divided muscles were sutured, those of the abdominal wall with the sacro-lumbalis, psoas magnus, and gluteus maximus. The skin wound was closed with sutures, but had to be partly opened on account of suppuration. Healing was completed in three months with the assistance of skin grafts.

Apart from some temporary disability of the bladder, the function of the pelvic organs was not disturbed. The tumour was a periosteal sarcoma, originating in the innominate bone, which had made its way through the thyroid foramen and become fused with the periosteum of the femur. When hardened it weighed over 6 kilos. — *Centralbl. f. Chir.*, Leipzig, 2nd September 1899.

RESECTION OF THE LIVER FOR CANCEROUS TUMOUR.

THIS, which is the third communication by Keen of Philadelphia on resection of the liver, contains an interesting account of a third successful case and an analysis of the recent cases reported by other surgeons. The patient was a male, æt. 50, who had suffered from pain in the epigastrium for about three months, and who had lost 30 lb. in weight during that time. There was a tumour in the epigastric region, bulging the abdominal wall, as large as a hand—firm, hard, and movable. Its dulness was continuous with that of the liver. The author was able to exclude the gastric origin of the tumour, but was uncertain as to its nature. The belly was opened on the 23rd April 1899; the tumour was found to be hepatic, and to consist of a number of large nodules occupying the entire left lobe of the liver. There being no involvement of glands, nor any nodules in the right lobe, it was decided to remove the entire left lobe along with the growths. The operation was done with the Paquelin cautery, without the help of any elastic ligature; the severance of the left lobe took from twenty to thirty minutes. The hæmorrhage was not very severe, except when some of the larger veins were opened into; each of these, when opened, was at once closed with the finger and then with a catgut stitch. Five ligatures were thus applied. When the cautery was laid aside to tie the veins, temporary packing of the raw surfaces with iodoform gauze was of great service in arresting the parenchymatous hæmorrhage. The amount of blood lost was estimated at 8 or 10 oz. A quart of saline solution was injected into one of the veins of the arm during the progress of the operation. When the tumour was removed, part of the resulting raw surface was obliterated by approximating the edges with catgut sutures; the remainder was stuffed with iodoform gauze, the end of this being brought out at the wound; it was removed at the end of forty-eight hours, and was found to be stained with bile. By the fourth day the discharge of bile through the opening left by removal of the gauze, was quite free, and amounted to some 3 or 4 oz. in the twenty-four hours. It ceased on the twelfth day.

The tumour, which was a carcinoma, measured 5½ in. in length, 4¼ in. in breadth, and 3 in. in thickness; it weighed 1 lb. 5 oz.—*Ann. Surg.*, Phila., September 1899.

THE TRAUMATIC PARALYSIS OF THE SHOULDER AND ARM.

DR. F. MALLY divides the forms of injury which may give rise to motor disturbances in the upper extremity into two classes—(1) Those which act in a slow and continuous fashion; and (2) those whose action is abrupt or instantaneous.

1. *The slow forms of injury* practically include all those which cause *compression of the nerves.* The anatomical situation of certain nerves of the arm render them specially liable. The musculo-spiral, median, and ulnar nerves may be pressed upon when the arm rests upon the back of a chair or the edge of a table (especially during sleep or anæsthesia), or when a crutch presses on the axilla, or when a tourniquet is applied to the upper arm with undue force, or when a tumour or mass of callus is formed. All these are attended with what may be called "trunk paralysis," in which the whole distribution of the nerve or nerves involved is affected below the site of compression. Similar forms of injury may come into play in the supra-clavicular region; the carrying of a weight on the shoulder may cause paralysis of the arm, either by pressing directly on the brachial cords, or more likely by depressing the shoulder to such a degree that the cords of the brachial plexus are overstretched. A similar form of paralysis may result from hyperextension

of the arm during sleep or anæsthesia. In these forms the distribution of the paralysis is very irregular and capricious, because the lesions affect the root cords of the plexus, from which the fibres are differently distributed in different subjects. At the same time the various forms of injury which have been referred to cause paralyses which are fairly constant in their characters; they may be termed *paralyses by compression*, and are characterised by four prominent symptoms: paresis or paralysis, paræsthesia, muscular atrophy, and conservation of the normal electric reactions. The degree of paresis or paralysis varies. The paræsthesia rarely amounts to anæsthesia. The muscular atrophy is very apparent and appears early. The electric excitability is present both in the nerve and in the muscle, and may be elicited either with the galvanic or the faradic current. The changes in the nerves in these cases of compression paralysis are but little known; they probably consist in circulatory disturbances, and are easily repaired, for spontaneous cure is the rule within two months.

It must be noted that in the preceding conditions, if the trauma be prolonged or repeated, or if the patient present a certain predisposition to nerve lesions, the character of the paralysis may be changed, the atrophy of the muscle may pass into degeneration, and the paralysis may become incurable.

2. *Injuries whose action is abrupt or instantaneous.*—The best example under this head is where a nerve cord is divided or torn across. The symptoms of this are constant: complete motor paralysis in the distribution of the nerve below the point injured, alteration in sensibility, rapid muscular atrophy, the reaction of degeneration, and histologically degeneration in the fibres of the nerve and of the muscles concerned. The clinical observation is of great importance, that when a sudden injury causes paralysis with the reaction of degeneration, the prognosis is grave, for it may be incapable of spontaneous recovery.

The paralyses which may accompany dislocation of the head of the humerus are worthy of special mention. While they may be due to the direct impact of the head of the bone on the nerve trunks, they may also result from an indirect effect on the roots of the brachial plexus; the forcible depression of the shoulder on the one hand, and the forced abduction on the other; these being the two chief causes of dislocation of the shoulder, cause at the same time a stretching of the cords and roots of the brachial plexus, and through the latter may injure the spinal cord itself.

The lesions which have been described, whether affecting the trunks of nerves or the nerve roots, may give rise to two sorts of paralysis:—

1. *Benign forms*, mostly paralyses by compression, which clear up and recover because there is no true Wallerian degeneration; *if they implicate the nerve trunks*, the distribution of the paralysis is equal throughout all the branches coming off below the lesion; *if they implicate the nerve roots*, the paralysis affects differently the various ramifications derived from the brachial plexus. The investigation of the electrical reactions enables one at an early stage to arrive at a prognosis; for in spite of muscular atrophy, there is no quantitative or qualitative difference between the healthy and the paralysed sides.

2. *Grave forms of paralysis*, mostly from abrupt or instantaneous

injuries in which, whether affecting the nerve trunks or the nerve roots, the reaction of degeneration is present from the eighth day onwards; the prognosis is therefore very much the same as when a nerve trunk has been divided or torn across.—*Rev. de chir.*, Paris, October 1899.

OBSTETRICS AND GYNÆCOLOGY.

UNDER THE CHARGE OF

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THE USE OF THE RENAL CATHETER IN DETERMINING THE SEAT OF OBSCURE PAIN IN THE SIDE.

HOWARD A. KELLY (*Am. Journ. Obst.*, N. Y., Sept. 1899) points out that for twelve years he has used the renal catheter in separating the urines from the two kidneys, and has found it of great value in comparing the condition of these organs. Also, in cases of stone in the kidney or ureter, the wax-tipped catheter has its smooth surface scratched by coming in contact with the stone, whereas in stricture the bite of the stricture is felt and the instrument moved with difficulty. In cases of pyelitis the slightest touch with the end of the catheter usually causes free capillary hæmorrhage, which is characteristic.

In addition, the contact of the catheter with the pelvis of the kidney sometimes produces pain, and the patient can frequently locate the pain as the same or different from that from which she has previously complained.

Acting upon this fact, the author has devised a plan by which he can, in many cases, locate the seat of lesions producing obscure pain in the side, and brings forward several cases in proof.

His method is as follows:—The patient is put in the knee-breast position, and the renal catheter introduced as far as the pelvis of the kidney; 10 to 15 c.c. of a bland fluid are then rapidly injected into the kidney, with the purpose of suddenly distending the pelvis and bringing on an artificial renal colic. As soon as she feels the pain, she will be able to locate it with her finger, and say whether it is similar in character and locality to the pain she previously complained of or not.

In one case, where the pain complained of was the same as that artificially produced, on operation a large dilated pelvis was found, showing that the patient had suffered from intermittent hydronephrosis, not, however, large enough to produce a palpable tumour.

In other two cases, where the diagnosis lay between an enlarged kidney and gall bladder, the pain artificially produced was different in nature and location from that ordinarily complained of, operation subsequently proving that the gall bladder was enlarged, in one case containing five hundred stones.

In cases of hydronephrosis with intermittent attacks, this method of diagnosis may be used not only to produce a typical attack, but to cause the formation of a palpable tumour, which verifies the diagnosis without waiting for an attack to come on spontaneously.

Dr. Kelly proceeds to relate in detail six cases in which this method either proved that the kidney was the seat of the lesion, or that it was situated in some other organ, which was verified by subsequent operation.

THE VALUE OF ANTISTREPTOCOCCIC SERUM IN THE TREATMENT OF PUERPERAL INFECTION.

A COMMITTEE of the American Gynæcological Society, consisting of Whitridge Williams (Baltimore), Pryor (New York), Fry (Washington), and Reynolds (Boston), report on the efficacy of antistreptococcic serum in the treatment of those forms of puerperal fever due to streptococcus infection. They draw their conclusions from a careful study of the literature of the subject and from their own personal experience in this form of treatment, but regret that, as their experimental work on this subject is not yet concluded, they cannot include its results in their report, which they sum up as follows:—

1. A study of the literature of the subject shows that 352 cases of puerperal infection have been treated by many observers, with a mortality of 20·74 per cent. Where streptococci were positively demonstrated, the mortality was 33 per cent.

2. Marmorek's claim that his antistreptococcic serum will cure streptococcic puerperal infection, does not appear to be substantiated by the results thus far reported.

3. Experimental work has cast grave doubts upon the efficiency of antistreptococcic serum in clinical work, by showing that a serum which is obtained from a given streptococcus may protect an animal from that organism, but may be absolutely inefficient against another streptococcus, and that the number of serums which may be prepared is limited only by the number of varieties of streptococci which may exist.

4. Thus far the only definite result of Marmorek's work is the development of a method by which we can increase the virulence of certain streptococci to an almost inconceivable extent, so that one hundred billionth of a cubic centimetre of a culture will kill a rabbit.

5. The personal experience of the Committee has shown that the mortality of streptococcus endometritis, if not interfered with, is something less than 5 per cent., and that such cases tend to recover, if nature's work is not undone by too energetic local treatment.

6. We unhesitatingly condemn curettage and total hysterectomy in streptococcus infections after full-term delivery, and attribute a large part of the excessive mortality in the literature to the former operation.

7. In puerperal infections a portion of the uterine lochia should be removed by Döderlein's tube for bacteriological examination, and an intra-uterine douche of 4 to 5 litres of sterile salt solution given just afterwards. If the infection be due to streptococci, the uterus should not be touched again, and the patient be given very large doses of strychnia and alcohol, if necessary. If the infection be due to other organisms, repeated douchings, and even curettage, may be advisable.

8. If the infection extends toward the peritoneal cavity, and in

gravely septicæmic cases, Pryor's method of isolating the uterus by packing the pelvis with iodoform gauze may be of service.

9. The experience of one of the members of committee with antistreptococcus serum has shown that it has no deleterious effect upon the patient, and therefore may be tried if desired. But we find nothing in the clinical or experimental literature, or in our own experience, to indicate that its employment will materially improve the general results in the treatment of streptococcus puerperal infection.—*Am. Journ. Obst.*, N. Y., Sept. 1899.

SIX CASES OF UTERINE TUBERCULOSIS.

OF this rare affection six cases occurred in the Göttingen Frauenklinik within ten months, perhaps in connection with the frequency of tuberculosis of the bones and joints at that place, but in one instance only did the tuberculosis affect the uterus alone. The diagnosis was established four times by abrasion, twice by exploratory laparotomy, and, with the hope of cure, the uterus was extirpated once by the abdomen and once by the vagina. As regards their pathological anatomy, the following forms of the disease were made out:—In the portio, tumour formations, shallow ulcers, miliary tubercles, and bacillary catarrh; in the corpus, miliary tubercles, caseous degeneration, and shallow ulceration. Clinically, little or no discharge; the menstrual flow was seldom increased; in most cases there was amenorrhœa. It is remarkable that, in spite of caseous endometritis, pregnancy may occur and have a normal termination.—VASSMER, *Arch. f. Gynaek.*, Berlin, Bd. lviii. S. 301.

A NEW METHOD FOR OPERATING FOR UTERINE CARCINOMA.

RECOGNISING that the lymphatics are very soon affected by cancer of the corpus, and especially of the collum uteri, and before it can be discovered clinically, Emile Ries (*Ztschr. f. Geburtsh. u. Gynäk.*, Stuttgart, Bd. xxxvii. S. 518) recommends that in every case the iliac glands, with the surrounding connective tissue, should be entirely removed. His method is as follows:—The vaginal walls are first divided by a circular incision; the abdomen is then opened in the middle line, and the great iliac vessels found. The peritoneum is opened by an incision along the common iliac artery. This vessel is exposed by blunt dissection, and the ureter is isolated down to its insertion into the bladder. The broad ligament is ligatured on one side close to the pelvis, and secured by forceps at the uterine end if necessary. The two branches of the uterine artery are thus exposed, ligatured, and divided.

By blunt dissection between the internal and external iliacs, they are freed from their surrounding connective tissue, and the whole of this, with its glands, is taken away. After this has been done on one side, the adhesions between the uterus and rectum are separated; those in the pouch of Douglas are divided near the rectum; and the utero-sacral ligaments, which often contain degenerated lymphatics and glands, are divided as far from the uterus as possible. When the whole of the above process has been repeated on the other side, the anterior and posterior *culs de sac* are dissected out, a circular incision is made in the

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"THE TIMES" in its issue of Sept. 5, 1899, referring to a report published in "*Kolnische Zeitung*," of an experiment made in the German Army with a new food for Soldiers called "TROPON," says, under—

NAVAL AND MILITARY INTELLIGENCE:—

"Twenty-five non-commissioned officers and men volunteered for the experiment, and were placed under the command of a Lieutenant. Each man received three days' rations of Tropon rusks, Tropon chocolates, Tropon bean and pea soup. During three days the men were to march, in full marching order, 30 kilometres each day and to sleep at night in the open air.

"A Tropon ration for three days weighs 1200 grammes, whereas the ordinary ration of solid food of the German soldier weighs 1950 grammes. The Tropon ration is also cheaper in proportion to the amount of nourishment it contains. The men found the Tropon food easy of digestion, and it kept them in good condition.

SOLD BY ALL LEADING CHEMISTS AND STORES.

SAMPLES and all PARTICULARS from the SOLE AGENTS—

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vaginal walls, and the uterus and appendages removed. To close the peritoneal cavity, the peritoneum on the one side is stitched to that on the other, and the vesical investment to the rectal. The operation lasts about three hours.

THERAPEUTICS.

UNDER THE CHARGE OF

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THE ACTION OF BROMIDES.

F. **Fessel** has published an interesting contribution to our knowledge of the behaviour of bromides in the animal body (*München. med. Wchnschr.*, 26th Sept. 1899), especially in relation to their sojourn in the organism and their excretion. He begins by pointing out that bromides sometimes cause certain unpleasant effects, "bromism," but that these more frequently remain absent, and when they do occur seem to depend on some unrecognised peculiarity in the condition of the sufferer. Observations by several observers have shown that on taking bromides a considerable amount of bromine is retained in the body, and the output of it only comes to equal the intake when the organism has, as it were, become saturated with the element. If no more bromide be then taken, bromine excretion goes on very slowly, and its presence can be recognised in the urine for several weeks. Excretion takes place chiefly through the kidneys, but it is also present in all the fluid secretions. While bromides are being taken, the amount of chlorides in the urine is greatly augmented, and from this the conclusion is drawn, that bromine ousts chlorine to a certain extent from its combinations in the body tissues and fluids. When Fessel administered bromides to cats, there followed a short stage of excitement and restlessness, succeeded by symptoms of paralysis of the brain and cord, and deep coma. When given continuously, there was great emaciation (1½ to 3 grs. daily). Dogs bore very much larger doses without showing any symptoms, and are certainly very much less susceptible than cats. When doses increasing from 30 grs. to 300 grs. were given daily, the dogs emaciated and suffered from paresis of the legs and slight diarrhœa, but never from stupor.

The toxic effects of bromides seem to be due to their retention in the body. When given for some time, hydrobromic acid largely replaces hydrochloric in the gastric juice. When administered to men or animals, only a small amount is at first excreted, the rest remaining in the body. It seems in these respects to matter little, if at all, whether the sodium or potassium compound be given.

When 300 grs. sodium bromide had been given in divided doses to a dog, the urine still contained bromine for ten weeks afterwards, but excretion was found to be greatly increased and accelerated by the administration of sodium chloride. Bromide compounds were found chiefly in the blood serum and corpuscles, and in the brain and kidney, mere traces being present in the liver and spleen. Fessel thinks that bromism is due to the large amount present in the blood, while the chlorides are at the same time greatly diminished, and that the action on the brain and cord is due to the combination of bromine with the nerve substance. Another point to which attention is drawn is, that during the administration of bromides, small quantities of iodine are found in the urine in some cases, and disappear when the bromides are stopped. The iodine seems to be derived from that present in the thyroid gland, but this is not quite certain until further observations can be made.

CHLORAL HYDRATE IN SOME FORMS OF NERVOUS DYSPEPSIA.

ROSENBACH has an article on the value of chloral hydrate as a sedative, and more especially in many conditions of nervous gastric disturbance (*Therap. Monatsh.*, Berlin, Sept. 1899). As a hypnotic its general usefulness is widely acknowledged, and where there is difficulty in falling asleep from palpitation, as in irritable conditions of the cardiac nerves, in præcordial anxiety, overwork, etc., no drug acts more promptly or safely, if the dose be properly adjusted. If the difficulty be in falling asleep, a very small dose is often sufficient to overcome this; but if it consist in waking soon from the first sleep with inability to fall asleep again, then the exhibition of an ordinary dose simply leaves matters *in statu quo*, although it may somewhat deepen the state of unconsciousness. To induce an unbroken sleep, a hurtfully large dose must be given, which is calculated to injure the general health and lessen the sense of well-being, doing therefore more harm than good. In the former case, a dose of 2 to 7 grs., dissolved in a pretty large quantity of water and flavoured, usually suffices. In the second class of cases the medicine must be taken on awakening from the first sleep, and in similar dose. If it cause a feeling of weariness, headache, or digestive disturbance, it is doing more harm than good. When alcohol is used as a hypnotic in similar cases, the same rules apply. In all nervous conditions it is of special value, and Rosenbach has used it largely in dyspepsia from emotional causes, reflex neuroses, in conditions of nervous cardiac action arising from the stomach, and in asthma due to similar causes, the so-called asthma dyspepticum. Here it seems to exert a local sedative effect on the stomach and bowel, and acts better than bromides, valerian, etc. Small doses cause in these cases a slight increase of peristalsis in the stomach and bowel, which is followed by a relief of the symptoms. It is difficult to specifically describe the cases in which it is especially useful, but in neurotic persons, who complain of dyspeptic symptoms after eating, such as fulness in the epigastrium, tiredness and headache, a certain amount of dyspnœa, acidity, and flatulence, especially after bodily or mental exertion, and who are at the same time sleepless, the administration of chloral hydrate is indicated. In such cases, where the disturbance is due to purely nervous causes, it excels alkalies and all the other ordinarily used stomachics, although these remedies are better where dyspepsia has not the neurotic etiology. It is often very useful in hyperacidity, cardialgia, and hyperperistalsis. Also in fermentative dyspepsia, with a feeling of distension and acid eructations, leading to nervous diarrhœa and colic. The dose need not be large, 2 or 3 grs. well diluted with water one or two hours after eating, and repeated if necessary. It may be taken several times daily if the symptoms are persistent, and in this dose has no hypnotic effect, but should be intermitted every few days.

CHRYSAROBIN AS A CURE FOR WARTS.

WARTS on the soles of the feet have been successfully treated by Fitz with chrysarobin (*Boston Med. and S. Journ.*, 1899). He found that, unlike corns, they did not improve under salicylic acid and collodion, but when he substituted a 10 per cent. solution in ether or in liquor guttapercha there was a speedy change. The wart was pared down till it bled, and the solution applied every night at bedtime. During the first week little change took place, but growth then stopped, and by the end of the third week the wart had usually disappeared. There seems to be atrophy of the whole substance, including the blood vessels. Warts on the hands may be treated in the same way.

DISEASES OF THE EYE.

UNDER THE CHARGE OF

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PREVENTION OF ACCIDENTS TO THE EYE.

THIS was the subject of the address given by the President of the Ophthalmology Section of the British Medical Association in August last, and both from a humanitarian point of view, and because of the frequency with which injuries to the eye call for investigation under the provisions of the Workmen's Compensation Act, Mr. Snell's remarks are worthy of careful attention. To begin with, he deals with minor injuries, which, unimportant in themselves, are apt to cause great damage by becoming septic. Seeing that among the employés of the great iron-works of Sheffield, innumerable foreign bodies are daily removed from each other's corneæ by the workers, and that the instruments used for this purpose are far from being surgically clean, he has induced the heads of at least one large work to supply for the use of the men themselves a little case containing "a couple of iridium platinum bent pointed spuds," along with a small spirit-lamp, so that they may be cleansed each time before use.

The work of a chipper or "fettler," which consists in freeing a steel or iron casting from its rough edges with hammer and chisel, is productive of many an accident. This is particularly apt to occur either if the man is working in a narrow angle of the casting, or when several are at work close to one another on the same job; passers-by even have many times been injured by the flying chips, and Snell has had several cases in which a man has lost first one eye and then the other when chipping. This is not wonderful when one remembers that there are four sources of danger—the casting, the hammer-head, and the head and point of the chisel. Besides the employment of shields and eye-protectors, certain firms have introduced the use of a pneumatic chipper, which removes the roughnesses more in the style of "a cheese-scoop in a fairly soft cheese," and chips scarcely fly at all; besides this, it will in an hour accomplish as much as six or seven men, but unfortunately it is only as yet applicable to comparatively soft steel, and even for this it has not proved an unqualified success.

As regards eye-shields themselves, glass is, of course, entirely out of the question for iron-workers, and Snell has found a type of protectors to answer best which he got made in strong but light wire gauze, somewhat after the style of Snellen's shields for use after cataract extraction, convex to allow free play of the globe underneath as well as to give the most efficient protection, and made of galvanised or aluminium gauze, so that it may not rust. For grinders these shields are not required, as the particles likely to injure them are so small; but the worker may wear either flat pieces of glass or the correcting lens for any refractive error which he may happen to have.—*Brit. Med. Journ.*, London, 12th August 1899.

THE TREATMENT OF NIGHT-BLINDNESS BY MEANS OF LIVER.

THE inevitable Hippocrates, from whom one can never escape, was accustomed to recommend in cases of night-blindness the ingestion of large quantities of raw ox-liver mixed with honey. Since his day the value of this treatment has been carefully inquired into by several observers, but all or nearly all report unfavourably of it. Trantas of Constantinople, however, finding it in use among the laity, has employed it in several patients with benefit. He first used the liver treatment for a young peasant whose vision was bad and becoming steadily worse, with the field of vision much contracted; he had also an enormously enlarged liver and spleen, and suffered from frequent and severe hæmorrhages from the gums, and from diarrhœa, in addition to marked night-blindness. The condition of his sight was so bad that in ordinary light he could only count fingers at five metres with the right eye, and at one and a half metres with the left, and when evening approached was quite unable to guide himself even with the better eye. Along with this there was, as there so often is, a form of dryness and sclerosis of the conjunctiva, and the corneæ were somewhat intransparent. Even so soon as a week after the commencement of the liver treatment (he took 200 grms. per diem), vision had improved to $\frac{1}{4}$, the morbid changes in the conjunctiva were gone, the fields of vision were enlarged, his diarrhœa was a thing of the past, and his general condition much improved; and after three months of persistent use of the liver treatment he left hospital practically cured of his night-blindness. In a number of other cases, all more or less resembling this, the ingestion of liver in quantity proved of great value, and in an epidemic of night-blindness which broke out, as it sometimes does break out in the East, along with a form of conjunctivitis, Trantas found that by treating all the patients on this plan he obtained much better and more rapid results than he had ever previously accomplished by other means.—*Rec. d'ophth.*, Paris, July 1899.

BLINDNESS AFTER LIGATURE OF THE CAROTID.

FIVE varieties of ocular lesion have been observed after ligature of the common carotid, namely, defect of sight, more or less complete, and more or less permanent; ulceration of the cornea; cataract; strabismus; and panophthalmitis. As regards the first, little is known as to its pathology; the second is probably due to defective nutrition; the third is very rare, and its etiology is also doubtful; the fourth is due to some central lesion; the last is brought on by septic infection. Siegrist of Basel has lately seen two cases of the first variety; the first occurred in a patient operated upon for cancer of the tongue; at the operation the external carotid was ligatured, but a week later it was necessary, on account of hæmorrhage, to tie both internal and common carotids. The patient immediately noticed the defect in sight; next day the ophthalmoscope showed appearances exactly similar to those of embolism of the retinal artery. Two or three days later the patient died, and at the post-mortem examination an embolism was found in the internal carotid, extending for 6 mm. into the ophthalmic artery. The second case was one in which, the day after the external and internal carotids were ligatured on account of pulsating exophthalmos, the patient complained of loss of sight; on the seventh day there was only projection in the outer portion of the field, and the appearances by the ophthalmoscope were those of embolism of the central artery. When seen five months later, the disc showed extreme atrophy, with vessels very small, thready, and only extending as far as to the edge of the disc; sclerosis of the vessels of the choroid was also present, and Siegrist attributed the conditions thus manifested to a thrombus of the central artery, followed by a similar event in the veins of the choroid. One or two of the subsequent speakers in the discussion, following the reading of Siegrist's paper, advocated the plan of employing digital compression first before ligature, in order to develop the collateral circulation which would by and by be required.—*Rep. Trans. Heidelberg Ophth. Soc.*, 1898.

BIFOCAL LENSES.

It is sometimes a convenience to a patient to wear bifocal lenses—glasses adapted to correct the refraction when the eye is regarding distant objects, and at the same time supplying the insufficient accommodation for near work also. M. Borsch of Paris has managed to turn out some beautiful specimens of this class of work, in which the supplementary lens is slipped in between the two layers of the lens for distant correction, which, for this purpose, is "slit open" in a plane parallel to its surface; the three portions are then all cemented together. The result is a very neat piece of workmanship, which shows so little sign of its mode of manufacture as to be a complete puzzle even to certain of the initiated in such matters. Specimens were shown at the April meeting of the College of Physicians of Philadelphia.

Tattooing of the Cornea.

One is often consulted by patients who have suffered from ulcer of the cornea, and who are anxious to be relieved of the deformity produced by the resulting scar. In many of these cases a very good effect is produced by tattooing the corneal nebula with Indian ink, but Trousseau considers that this little operation, which is generally regarded as a mere trifle, ought not to be entered upon too lightly. He points this moral with great effect in connection with a case with which he met recently, in which he was witness of a most disastrous accident. He makes a rule—and a very wise restriction it is—to refuse to operate in any case in which the iris is incorporated in the cicatrix; he therefore declined to tattoo the corneal scar of a young man who came to seek his advice regarding a "leucoma adherens" of the cornea, and advised him against allowing anyone to attempt this. The patient was, however, extremely desirous to have the deformity removed, and consulted a more complaisant surgeon, who tattooed the opaque area, with the unfortunate consequence that sympathetic inflammation came on from the ciliary irritation produced by the presence of the minute foreign bodies—particles of carbon—introduced into the cornea, and the sight of both eyes was completely and permanently lost. Trousseau believes that he has observed instances of the same happening after tattooing of a simple corneal scar without any iritic adhesions.—*Ann. d'ocul.*, Bruxelles, March 1899.

Treatment of Glaucoma by Resection of the Sympathetic.

Since his earliest attempt at the cure of glaucoma by the somewhat heroic method of removal of the cervical sympathetic, Jonnesco has operated eight times, including cases of acute, chronic irritable, absolute with irritation, and simple glaucoma. Five definite results he has obtained, which may be stated as follows:—(*a*) In every instance immediate and lasting reduction of the ocular tension; (*b*) permanent contraction of the pupil; (*c*) disappearance of the head pains; (*d*) cessation of the exacerbations; (*e*) marked and lasting improvement in vision,—in all those cases, at least, in which the atrophic processes resulting from the increase of tension had not gone to so great a degree as to extinguish vision altogether before he operated. A peculiar and important feature of this improvement in sight was that it occurred immediately, as well as that it continued to advance with time. In three cases, however (two of glaucoma absolutum and one of acute glaucoma), no restoration of vision at all was obtained. It is certain that in the cervical sympathetic there are fibres, stimulation of which gives rise to increase of intra-ocular tension, dilatation of the pupil, contraction of the small intra-ocular vessels, energetic contraction of the peribulbar unstriped muscular apparatus, and probably increased activity of the secreting mechanism for the aqueous humour, thus bringing about increased inflow into the eye, while the portals of exit are reduced—in short, glaucoma. We have then only to suppose that in a case of ordinary glaucoma there exists, for some unknown reason, an over-activity, permanent or intermittent, of these fibres. Removal of the superior cervical ganglion destroys all the vessel-contracting mechanism of the eye, blood pressure at once sinking and extravasation from vessels diminishing; it destroys the excitory nerve mechanism of secretion, so that there is less formation of aqueous humour; it destroys, too, the pupil-dilating fibres, so that there is myosis, the angle of the anterior chamber thus remains free and the route of exit patent; lastly, it destroys the innervating fibres of the unstriped muscle surrounding the globe, whose contraction helps to render the exit narrow and difficult. These are the grounds, then, on which Jonnesco considers removal of the superior cervical ganglion to be indicated, at all events in certain classes of cases of glaucoma. He does not affect to believe that by so proceeding he reaches the *fons et origo mali*, for this he considers to be central and not peripheral, but removal of the superior cervical ganglion effectually and permanently closes the route by which evil comes. It is obvious that the cases in which this treatment is likely to prove most satisfactory are those in which the nervous element is most strongly marked, that is, the chronic cases; the acute congestive cases are much less amenable. This is in one aspect a fortunate circumstance, for the chronic cases are by common consent admitted to be far less satisfactory to deal with by any of the usually accepted lines of treatment than the acute forms are. In fact the matter may be put briefly thus: The more acute the case is, the better are the prospects after iridectomy, and the less good is to be looked for from resection of the sympathetic; while, on the contrary, the more chronic a case is, the more certain is Jonnesco's operation to do good, and the less the benefit to be obtained from iridectomy. The author does not seem to regard the operation as at all difficult or dangerous, and states that he considers fifteen minutes sufficient time in which to remove the sympathetic ganglia on the two sides; for he considers mere division of the trunk quite unsatisfactory in results as compared with excision.

Demicheri of Monte Video also reports favourably of this procedure; he has now operated on three patients, all women, one of whom was 70 years of age, and another 81. In all, the tension was permanently and decidedly reduced, vision increased, and the visual fields much expanded.—*Wien. klin. Wchnschr.*, 1899, Bd. xviii.; and *Ann. d'ocul.*, Bruxelles, March 1899.

ORBITAL COMPLICATIONS OF EMPYEMA OF THE ETHMOIDAL CELLS.

IN what proportion of cases of pus formation in the ethmoidal cells, orbital complications arise, it would be very difficult to say, but these instances are far from being very uncommon, and the condition of affairs then becomes serious. The subject has been carefully dealt with in a long paper by Vieusse of Toulouse, well worthy of perusal. In his review of the symptoms he states that the starting-point of the orbital mischief is probably always the destruction of the os planum of the ethmoid; for he rejects the suggestion that the veins can prove the channel of infection. Once this occurs, a rounded swelling appears at the inner angle of the lids, accompanied by proptosis and œdema of the lids; this swelling may be either localised or diffuse, and may be as small as a pea or as large as a walnut. Generally speaking, it is painless, soft, and fluctuating, and when it is pressed on, crepitation may be felt, and fluid may escape from the nose. The degree of proptosis is not necessarily great, and the direction of projection is usually downwards and outwards along with the exophthalmos. In a certain number of the cases the pressure to which the optic nerve is exposed induces a neuritis, or at least vascular changes indicating a minor degree of this condition. Very frequently in the later stages of the disease distension has spread to all the sinuses—frontal, ethmoidal, maxillary, and sphenoidal; but in the earlier stages it may be confined to one of these. It is really only between the frontal and ethmoidal that there comes to be any difficulty in the diagnosis, and the chief points in the distinction of one from the other may be briefly stated thus: The spot of greatest pain and tenderness is different in the two; in ethmoidal disease there is a much greater liability to orbital invasion; when a frontal pus formation discharges by way of the orbit, the sinus is always, according to Panas, in the oculopalpebral furrow. If pus is found in the middle meatus of the nose, it has probably come from the frontal or anterior ethmoidal cells, pus in the superior meatus from the posterior (or sphenoidal) cells. These and certain minor points are suggested as means of differential diagnosis, but none are very decisive. In regard to treatment there is little to be said; one simply proceeds on general principles.—*Rec. d'ophth.*, Paris, March, April, and May 1899.

REPORTS OF THE MEDICAL SOCIETIES.

Edinburgh Medico-Chirurgical Society.—*1st November* 1899.—Sir John Batty Tuke, President, in the chair.—Dr. James showed (1) a boy, æt. 6, suffering from slight cretinism; (2) a man, æt. 31, suffering from keratodermia symmetrica erythematosum. — Dr. Boyd, in Dr. Gilchrist's absence, showed a girl of 14, who was mentally very deficient and exhibited other signs of cretinism, with a very large thyroid gland.—Dr. Shennan showed for Dr. Bruce a specimen of syphilitic ulceration of the intestine from a case of general waxy disease.—Dr. Gulland read a paper "On the Importance of Examining the Blood in Doubtful Cases of Disease," and spoke of many cases where the diagnosis was obscure and in which an examination of the blood was of great value. Attention should be paid to the number of red blood corpuscles, the percentage of hæmoglobin, the number of blood plates, the rapidity of formation of the fibrin network, and the number and nature of the leucocytes. As instances of the changes produced in the various constituents of the blood by certain diseases, Dr. Gulland pointed out that, while in influenza there is no increase of leucocytes, they are greatly increased in rheumatism, pneumonia, suppuration, and malignant disease. A fall in the number of red blood corpuscles occurs in hæmorrhage and in septicæmia. The different varieties of leucocytes should be determined. Thus the eosinophiles are increased in number in true asthma, and especially so in trichinosis. —Sir J. Batty Tuke, the retiring president, then delivered his valedictory address, which will appear in a future number of this Journal.

Edinburgh Obstetrical Society.—*Wednesday, 8th Nov.*—Dr. Halliday Croom, President, in the chair. — The retiring President (Dr. Croom) delivered his valedictory address, which will appear in a future number of this Journal.—Dr. Milne Murray, the new President, having taken the chair, Dr. Brewis read a "Note of a Solid Intraligamentary Tumour." The tumour was a rapidly growing one, which, from the fact that the uterus was normal in size and was tilted up above the symphysis pubis, Dr. Brewis took to be growing between the layers of the broad ligament. On opening the abdomen, he found a large, soft, solid tumour growing extraperitoneally, and this, after tying the ovarian and uterine arteries, he removed along with the body of the uterus.

He established a drain from the stump through the posterior fornix into the vagina, and packed it with gauze. It was a fortnight since the operation, and the patient was doing well. Dr. Brewis said that the exact nature of the tumour was still *sub judice*. Two pathologists had expressed the opinion that it was a myxofibroma, while one believed it malignant in character.

FORFARSHIRE MEDICAL ASSOCIATION. — *1st November* 1899. — Dr. **TEMPLEMAN**, Vice-President, in the chair.—Dr. **MACKIE WHYTE** read notes of a man, æt. 39, who had cardiac failure with angina for thirteen months. He had aortic regurgitation, with a slowly progressing dilatation of the heart, and latterly severe pain over the liver. The post-mortem examination showed fatty and dilated heart without hypertrophy to any degree; atheromatous and dilated aorta; small coronary orifices; perihepatitis and perisplenitis. — Dr. **M'GILLIVRAY** read a paper on "The Treatment of the Tear-duct Obstruction," and in it stated that he had almost entirely abandoned repeated probings, preferring the use of solid metal styles made of electric fuse wire. After dividing the lower canaliculus and the stenosed portion of the tear-duct, a bulbous probe is inserted, and then the style. The style need not be removed for two or three months, by which time the cure is generally complete. The only further treatment necessary is the use of an alum and boracic lotion for bathing the eye, and the emptying of the sac by pressure over it with the finger.—Dr. **MACKIE WHYTE** gave the results of treatment of tape-worm in six cases by internal administration of chloroform. The results were, on the whole, disappointing, and usually the oil of male-fern had to be given ultimately. His results were compared with those published by Leichtenstein, who was against the efficiency of chloroform.—Professor **STALKER** read a paper on "Delayed Recovery in Pneumonia." In his paper he compared the temperature chart in such cases with that in specific fevers, and sought to explain the prolongation of the fever in some cases of pneumonia by some septic infection of the pneumonic exudation.

GLASGOW PATHOLOGICAL AND CLINICAL SOCIETY.—*9th October* 1899.—Dr. **THOMAS BARR** (President) in the chair.—Dr. **RUTHERFORD** showed a child, æt. 7½, from whom he had removed an occipital meningocele of a size slightly less than that of an egg. He considered that the child was imbecile, and he did not expect any improvement in the mental condition to follow the operation. He also showed an œsophagus which was the seat of a valvular stricture, about 1 in. above the cardiac orifice of the stomach. Witzel's operation for gastrostomy was performed, but the patient died thirty-six hours after the operation.—Dr. W. L. **REID** showed the parts removed by vaginal hysterectomy for malignant disease of the cervix. It was thought that the case was one of polypus, but microscopic examination of scrapings from the cervix gave rise to a suspicion of malignancy, confirmed by examination of the removed organ.

13th November 1899.—The **PRESIDENT** (Dr. **BARR**) in the chair.—The **PRESIDENT** showed—(1) Case of a deaf-mute on whom he had performed Stacke's operation for purulent otitis media. The patient showed a large cavity in the mastoid and post-meatal regions, lined with epithelium, and freely open to the air. There was no discharge. (2) Case in which Stacke's operation had been followed by a secondary measure, dealing with thrombosed lateral sinus. This was treated by ligature in the neck, and removal of bone along whole course of sinus—opening the latter and cleaning out the thrombus. The operative treatment of the sinus-condition had been carried out by Dr James H. Nicoll.—Dr. DONALD FRASER (Paisley) showed a specimen of omentum and bowel from a case of thrombosis of a branch of the superior mesenteric vein. For some time previous to admission, the patient had severe abdominal pain, varying in situation. There was also vomiting, but no abdominal distension. On examination, beyond emaciation and a dilated stomach, little could be made out. On the night after admission he suffered from bloody diarrhœa, followed by copious hæmorrhage from the bowel, and death in forty-eight hours. — Professor MUIR showed—(1) A specimen of a calcifying sarcoma of the humerus. The tumour was only of six weeks' duration, and had spread down from the upper end of the humerus to beyond the middle of the shaft. (2) Three specimens of tubercular pericarditis, and a series of microscopic specimens illustrating Weigert's method of staining yellow elastic tissue.—Dr. ALFRED YOUNG showed a patient, æt. 5, with a nævoid growth in left temporal region.

ANALYTICAL REPORTS.

ARTIFICIAL FOOD PREPARATIONS.

As a number of artificial food preparations have recently come to hand, we propose to notice them conjointly. They comprise meat extracts, powders, juices, jellies, and soups; vegetable extracts; meat and malt wines; and fatty preparations.

Artificial preparations such as these are chiefly intended to supply nourishment in small bulk, and of easy utilisation for those who are invalided; for travellers and athletes, because of lessened weight to carry, and decrease of fluid to imbibe; and for healthy persons who may be in need of a pick-me-up, which can cheer without inebriating; all of whom are respectively and conveniently aided towards increased energy and vitality by their use.

The question of the actual food value received in return for the money spent on these foods, though often of interest, is largely discounted by the increased ease and rapidity of their absorption and utilisation. The food value of most artificial foods, coin for coin, is lower than those of ordinary articles of food, which correspond to them in constitution. But the lessened bulk, and the almost entire absence of indigestible remainder, serve to fit them for the sick, for the weakly convalescent, the dyspeptic, often to turn the scale 'twixt life and death, when the flickering strength may gain enough support to enable it to continue the fight; and again for healthy persons, to help them, under many conditions, when their employment forms a valuable auxiliary to ordinary dietaries.

The preparations under our notice may be divided into several classes:—

1. Dried foods, largely proteid in character, as Bovril Beef Powder, Stamnoids, and Lozenges; Brand's Nutrient Powder; Marvis; Protene Biscuits; Somatose.
2. Semi-solid foods, also chiefly composed of proteids and nitrogenous extractives.—(1) Of animal origin—Bovril, Invalid Bovril, Vigoral; Lipton's, Armour's, and Valtine's, Carnos, and Liebig's Extracts of Beef; Borthwick's and Brand's Beef, and "Hipi" Mutton-Essence. (2) Of vegetable origin—Vejos, and Fromm's Extract and Soup Tablets.
3. Fluid or jellied flesh foods.—Bovril, Armour, and Brand's Meat Juice, Lipton's Fluid Beef, Borthwick's Bouillon, Bellis's Turtle Soup, Bovril Beef, and Benoist's Turtle Soup; Jellies.
4. Chiefly carbohydrates.—Mellin's Food Biscuits.
5. Malt and Meat wines.—Glendenning's and Crown Brands.
6. Largely fatty.—Bovril's Virol and Marrol.

Table showing Percentage Composition of some Artificial Food Preparations.

	Brand's Nutrient Powder.	Bovril Beef Powder (from supplied Analysis).	Marvis.	Somatose.	Protene Biscuits.	Mellin's Biscuits.
Constituents per cent.—						
Water	8·2	3·61	11·89	10·36	7·0	12·8
Total solids . . .	91·8	96·39	88·11	89·64	93·0	87·2
Ash	12·3	9·16	3·42	7·56	4·1	0·86
Organic solids . .	79·5	87·23	84·69	82·8	88·9	86·34
Nitrogenous—						
Extractive } Proteid } .	74·0	83·43	56·3	81·8	88	10·5
Carbohydrates .	...	...	14·8	...	trace	75·2
Fat . . .	4·2	3·8	2·1	...	...	0·64
Undetermined .	1·3	...	11·49	0·22	0·9	...
	Dry Foods.					

	Carnos.	"Hipi."	Armour's Beef Juice.	Brand's Meat Juice.	Fromm's Extract.	Vejos.
Constituents per cent.—						
Water	54·41	35·2	74·1	60·0	25·3	24·7
Total solids . . .	45·59	64·8	25·9	40·0	74·7	75·3
Ash	8·0	8·42	7·51	10·35	10·1	14·7
Organic solids . .	37·59	56·38	18·39	29·65	64·6	61·23
Nitrogenous—						
Extracive .	22·28	16·6	9·54	29·65	20·4	38·1
Proteid .		38·22	8·35			
Carbohydrates .	15·31	...	...	...	10·9	19 54
Fat . . .		1·56	...	...	32·8	...
Undetermined .		...	0·5	...	1·31	3·59
	Semi-solid.		Meat Juices.		Vegetable Extracts.	

Reference to the table supplied above as to the composition of several of the preparations discussed here, serves to show that the constituents of these various forms differ widely in proportion, generally and specifically. Another point which is apparent is the large percentage of nitrogenous material in the majority, although in some the nitrogen exists largely in non-nourishing though stimulating and tonic extractive matter. The greater assimilability, and rapidity of incorporation into, or co-operation with, the protoplasm of the cells of the tissues and organs, increase their dietetic and medicinal values.

On the other hand, this very ease of absorption may prove an obstacle to their employment in quantities sufficient to maintain the metabolic equilibrium of the body, although capable of prolonging life when given in less amount, of facilitating the digestion of other foods, or of so stimulating the powers of the tissues and organs generally, as to enable them the better to deal with their duties. To supply the 20 grms. of nitrogen, as contained in proteid, regarded as the average amount requisite for man per diem, 53 oz. of Armour's Beef Juice would be necessary, calculating this from their own published analyses; about 11·7 oz. of Vejos, 5·4 oz. of Somatose, 7·8 oz. of Marvis, or 5·0 oz. of Protene, and of Bovril Beef Powder.

If it is desired to amplify the amount of proteid in the food above that which the body is in absolute need of, Protene, Marvis, and Vejos, along with other preparations similar in type to each of these, may be employed. If stimulation of the gastric powers be also wished for, Somatose and the like act well. If a less amount of proteid is desired, and either the stimulating effects of flesh extractives indicated, along with some proteid additions, the beef juices, jellies, and bouillons serve the purpose in view.

In noticing so many of the results of modern dietetic ingenuity, it is only fair to state our opinion, where all are so carefully and honestly prepared, that it is both invidious and unfair to place any one food product upon an especially high pedestal; for although they cannot all possibly be regarded as equal in their nutritious properties, nor in their digestibility, some proffer us the best aid under one set of circumstances, others under others; one patient tolerates one preparation, another is better suited by a different form.

Of the dry forms in which concentrated proteid can be given, among those under notice, Protene—altered milk casein in the form of a flour—has already been described in our pages (Jan. 1899, p. 101), as also Somatose, a deutero-albumose from the digestion of meat; and lacto-somatose, a deutero-caseinose from milk (May 1898, p. 558). Both are practically pure proteid bodies, and have proved most useful in cases of dyspepsia.

Protene, prepared as it is in various forms, serves diabetes well. Somatose has been given to nursing mothers with great benefit. Both, however, in bulk are apt to disturb the bowel and to disagree.

Marvis (Patent Fish Food Company Limited, Greenock) is a most promising preparation of specially treated white fish muscle, which, after many months of experimental research, will be shortly, if it has not by now been, placed on the market. Consisting of white fish, fresh from the sea, the skin, head, viscera, and larger bones removed; the remaining muscular tissue and finer bones thoroughly cooked, dried, and reduced to a flowery powder; a small quantity, evidently of some cereal, cooked and powdered similarly, having been added to facilitate mixing with water, Marvis is a food with an unusual nutritive value, and, what is more, is both palatable and cheap. Marvis made into thick soup, *secundum artem* as per recipes, forms a most delicious and sustaining article of diet, free from all pronounced taste of extractive bodies, so soon cloying in meat extracts.

Our analysis gives Marvis a proportion of 8·65 per cent. of nitrogen, corresponding to 54 per cent. of proteids, if it be all present as a constituent of this class of food elements. Its phosphorus, as phosphoric oxide, forms 1·45 per cent., half of which is in organic, half in inorganic combination. Moisture accounts for 12 per cent. of the total.

At present sent out in tins containing 4 oz., we are glad to note that it is proposed later on to provide the food in special glass bottles, whereby all danger of metallic contamination will be removed.

Bovril Stamnoids are dried Bovril pressed into the form of the common tablet or tabloid. Sustaining and nourishing, they are, however, not so pleasing to the eye or the palate as the better known Bovril lozenges.

Brand's Nutrient Powder (Bence's Patent) is a pure preparation of raw flesh, desiccated below the coagulation point of muscle proteids, and best administered in teaspoonfuls in beef-tea, milk, sandwiches, etc., as inclination directs. It smells of meat extractives, but its smell is greater than its taste.

Mellin's Food Biscuits constitute a dry food of utility and nourishing value of a somewhat different character. With 10·5 per cent. of proteid of vegetable origin, they contain 75·2 per cent. of carbohydrates, and 0·64 per cent. of fat. We have found them most useful, palatable, and sustaining for adults of weak digestion, given between meals. The only suggestion we should offer is that Mellin might prepare more than one variety of biscuit, and especially one variety less sweet than the present form, as its sugary taste, though pleasant at first, cloys later; perhaps, also, another variety flavoured, say, with ginger.

(*To be continued.*)

Microscopic Stains.

Careful examination of Burroughs, Wellcome, & Co.'s "soloid" microscopic stains, Bismarck-brown, eosin, fuchsine, gentian-violet, and methylene-blue, shows them to be exceedingly convenient for making the usual staining solutions as required for bacteriological and histological methods. Each tabloid contains 0·065 grm. of the stain, so that one tabloid dissolved in 6·5 c.c. of fluid will make a 1 per cent. solution. It is of the greatest importance for diagnostic purposes to have a really good and reliable stain. These tabloids are easily soluble, and their staining reactions are specially good, and compare favourably with those of Grübler of Leipzig.

Although the stains in themselves are excellent, the printed directions issued along with them are open to criticism in various particulars, the most important being that the solutions recommended for ordinary staining purposes are usually too weak.

Löffler's stain is satisfactorily made from the methylene-blue tabloids, but we prefer to use a 1 per cent. watery solution of methylene-blue for staining smear preparations, and sections of tissues containing bacteria. In staining blood films, excellent results are got by using a 2 per cent. watery solution of eosin and then the 1 per cent. watery solution of methylene-blue. The gentian-violet makes a good Gram's stain, and also gives excellent results in staining for flagella. The fuchsine tabloids are particularly good for making Ziehl Neelsen's stain, and give exceedingly fine results with tubercular and leprous tissues. The Bismarck-brown tabloids make an excellent contrast and nuclear stain.

OBITUARY.

William Christopher Arnison, M.D., D.C.L.

Only a few months ago the University of Durham College of Medicine lost by death its able Lecturer on Midwifery, Dr. Thomas Cargill Nesham, and now it has to deplore the death of its Professor of Surgery, Dr. William Christopher Arnison, at the age of 62, from pneumonia. Professor Arnison lectured at the College of Medicine on 30th October, and died on 4th November. In the course of the day upon which he gave his last lecture, he had complained of feeling cold when at a consultation with a medical friend. Shortly after reaching home that evening he completely collapsed. Signs of pneumonia developed within two days. From the first the symptoms were severe. Medical attention was tenderly given by Dr. Armstrong Atkinson, Dr. W. D. Arnison, and Dr. Frederick Page, but despite this the invalid gradually sank, and died on the fifth day of his illness.

For more than forty years Professor Arnison was connected with the Newcastle College of Medicine, first as a student, and subsequently as a lecturer. In 1867 he was appointed Honorary Surgeon to the Infirmary, in succession to Sir John Fife. For thirty years he held this distinguished post, and on retiring from it two years ago, on the age limit, he, with his colleague, Professor Philipson, was entertained at a banquet, and made the recipient of a silver bowl as an expression of the esteem in which he was held by the students.

Twenty years ago, Dr. Arnison became Co-lecturer on Surgery at the College of Medicine with Dr. Heath, and on the death of Professor Heath, Dr. Arnison was appointed Professor of Surgery in the University of Durham. His principal contributions to the Medical Journals are, "Successful Ligature of Subclavian Artery for Axillary Aneurysm," "Anterior Colotomy," and "Successful Trephining for Traumatic Epilepsy."

In 1896, Professor Arnison received the degree of Doctor of Civil Law from the University of Durham. A man of the strictest integrity, and without enemies, Dr. Arnison was of a kindly disposition, and was much liked by the students. He died as he had lived, a thorough Christian. His funeral was attended by the students and by his colleagues of the College of Medicine, by Infirmary representatives, and a large number of his patients and professional brethren. There was evidence on all sides of deep regret at the loss the city had sustained, and of sincere sympathy for Mrs. Arnison and her three young daughters.

T. Oliver.

MONTHLY NOTES
ON METEOROLOGY AND VITAL STATISTICS.

By A. LOCKHART GILLESPIE, M.D., F.R.S.E., F.R.C.P.Ed.,

MEMBER SCOTTISH METEOROLOGICAL SOCIETY.

METEOROLOGICAL MEANS FOR THE EAST OF SCOTLAND DISTRICT, FOR THE FOUR WEEKS ENDING OCTOBER 28, 1899; AND FOR THE YEAR FROM JANUARY 1.

	Temperature.			Rainfall in Inches.		Sunshine. Hours.		Mean Daily Variability of Temperature.
	Mean.	Accumulated Day-Degrees. Above 42°.	Accumulated Day-Degrees. Below 42°.	Actual.	Accumulated from Jan. 1.	Actual.	Accumulated from Jan. 1.	
Mean	46°·2	[1] 174° [2] 2228°	31° 684°	2·9	25·7	80	1186	2°·7
Observed	47°·9	[1] 188° [2] 2399°	17° 694°	1·1	25·6	91	1267	3°·4
Difference	+1°·7	[1] + 14° [2] + 171°	−14° +10°	−1·8	−0·1	+11	+81	+0°7

VITAL STATISTICS.

MORTALITY IN FOUR LARGE TOWNS IN THE EAST OF SCOTLAND (EDINBURGH, DUNDEE, ABERDEEN, AND LEITH), DURING OCTOBER, AND SINCE JANUARY 1, 1899. Actual Numbers and Rate per 10,000 per annum.

	Total.		Constitutional Diseases.		Circulatory System.		Respiratory System.		Nervous System.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 1,054 [2] 10,956	184·7 191·7	198 2164	34·6 37·9	102 1039	17·8 18·17	192 2030	33·6 35·5	120 1248	21·0 21·8
Actual Deaths and Rate per 10,000	[1] 996 [2] 11,054	174·3 193·4	226 2332	39·5 40·8	104 1035	18·2 18·1	156 1778	27·3 31·1	114 1282	19·9 22·4
Difference from Mean	[1] − 58 [2] + 98	− 10·4 + 1·7	+ 28 + 168	+ 4·9 + 2·9	+ 2 − 4	+ 0·4 −0·07	− 36 −252	− 6·3 − 4·4	− 6 + 34	− 1·1 + 0·6

	Digestive System.		Urinary System.		Pneumonia.		Phthisis.		Cancer.	
	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.	No.	Rate.
Deaths expected and Mean Rate for 1891–1897	[1] 80 [2] 739	13·9 12·8	30 288	5·2 5·0	71 779	12·3 13·6	97 1075	17·1 18·8	49 484	8·6 8·5
Actual Deaths and Rate per 10,000	[1] 90 [2] 862	15·7 15·0	25 283	4·4 4·92	82 831	14·3 14·5	105 1079	18·6 18·87	67 587	11·7 10·3
Difference from Mean	[1] + 10 [2] + 123	+ 1·8 + 2·2	− 5 − 5	−0·8 −0·08	+ 11 + 52	+ 2·0 + 0·9	+ 8 + 4	+ 1·5 + 0·07	+ 18 + 103	+ 3·1 + 1·8

* NOTE.—The figure [1] denotes the data for October, [2] for year to date.

October in the east of Scotland was a warm month, very dry and sunny, but with a markedly increased variability of temperature from day to day. The deficiency in the rainfall is equal to 62 per cent. of the total expected, the excess in hours of sunshine 13·7 per cent. The surplus accumulated degrees of warmth over 42° exactly equalled the lessened number of degrees of cold recorded below 42°, but in the first case the excess amounts to only 8 per cent. of the total looked for, while in the second the defect is as much as 45 per cent. of the same. That is to say, that there was a marked absence of cold rather than presence of any pronounced warmth.

The year to date yields an accumulated excess over the normal day-degrees above 42° of 171°, or equal to 7·6 per cent.; a slight increase of day-degrees below 42°; an average rainfall; and an increase in hours of bright sunshine equal to 6·9 per cent. of the mean.

In the four large towns included here, the number of deaths recorded during October was less by 5 per cent. than the average, chiefly owing to decrease among deaths from respiratory, nervous, and urinary causes; 18·7, 5, and 16·6 per cent. of the average respectively. On the other hand, increased numbers died from constitutional (14·1 per cent.) and digestive (12·5 per cent.) causes, from pneumonia (15·5), phthisis (8·2), and from cancer (36·7). Influenza was registered as the cause of one death.

For the year to date, a slight increase in the total number of deaths, increases of 7·7, 16·6, and 21·7 per cent. of the totals under constitutional, digestive, and cancerous diseases; and a marked decrease under the respiratory system as a whole, equal to 12·4 per cent., are shown.

October, warm, dry, sunny, anticyclonic, with a temperature varying much from day to day (the mean daily range was 20 per cent. larger than the average, and only equalled previously in October 1860), and light winds, shows a diminished mortality, largely from respiratory causes, but an increased number of deaths from pneumonia and cancer; while the first ten months of the year 1899—warm, sunny, with an average rainfall—yields a slightly increased mortality, marked under constitutional, digestive, and cancerous diseases; a decrease under respiratory ailments, although pneumonia shows a considerable increase.

GENERAL INDEX.

INDEX.

PAGE

ABDOMINAL CAVITY, Accident in which a Crowbar traversed the Vertical Diameter of the, by A. C. MILLER . 264
,, Massage . . . 287
,, Operations, Thrombosis in the Veins after . 76
,, Sections in the Western Infirmary, Glasgow . 81
Accessory Sinus Suppuration . 474
Acne, Chlorine 183
Aconite, Case of Recovery after drinking Half an Ounce of Liniment of, by W. A. POTTS . . 541
Acromegaly, by G. A. GIBSON . 505
,, with Alimentary Glycosuria, Paroxysmal Hæmoglobinuria, and Swellings of Joints . 536
Adenoid Vegetations . . . 189
Adenoma, Hysterectomy following Double Ovariotomy for . . 181
AFFLECK, J. O., and D. A. WELSH, Observations on a Case of Intermittent Fever 105
Albumosuria, Enterogenous . . 534
Alcohol, Theory of the Action of, and Allied Bodies . . . 285
Alcoholism, The Use of Hypnotism in 470
ALLBUTT, T. CLIFFORD, System of Medicine by Many Writers, vol. vi. *Review* . . . 165
,, Vol. vii. *Review* . . 446
AMBLER, J. R., Atheroma of the Aorta 537
Anæmia, Absence of Nucleated Red Corpuscles in the Blood, in Cases of . 85
,, Value of Hæmoglobin in 185

Analytical Reports—

Vitæ Ore, 101 ; Horlick's Malted Milk, 101 ; Crown Meat and Malt Wine, 102 ; New Patent Poison Bottle, 102 ; Esvach Water, 200 ; Emol-Keleet Soap, 200 ; Heroin Hydrochloride, 201 ; Infants' Foods, 301 ; Humanised Milk, 303, 304 ; Milkmaid Brand Swiss Milk, 304 ; "Frame Foods," 305 ; Cognac Brandy, 306 ; "Friar's" Soaps, 306 ; Ellis's Table Waters, 306 ; New Tabloids, 387 ; Chocolate Coated Tabloids, 387 ; Tanno-Pumilio, 388 ; Infant and Invalid's Food, 484 ; "Allenburys" Foods, 485 ; Benger's Food, 485 ; Horlick's Malted Milk, 486 ; Mellin's Food, 486 ; Moseley's Food, 487 ; Neave's Food, 487 ; Robinson's Patent Barley and Patent Groats, 488 ; Peptogenic Milk Powder, 488 ; Savory & Moore's "Best Food for Infants," 489 ; Antiarthrin, 489 ; Kryotine, 489 ; Taka Diastase, 490 ; Ergot Aseptic, 490 ; Artificial Food Preparations, 576 ; Microscopic Stains, 579.

PAGE

Anthrax 460
Antistreptococcic Serum, Value of, in the Treatment of Puerperal Infection 563
Anuria from Uterine Cancer . . 178
Aorta, Atheroma of the, by J. R. AMBLER 537
Aortic Valve, Some Points of Interest in the Morbid Anatomy of the, by THEODORE FISHER . 413
Appendicitis, by GILBERT BARLING 494
Arsenic, the Cause of Tolerance to 286
,, in the Eczema of Children 184
Arthritis Deformans, Operative Treatment of 558
Ascites, An Unusual Case of, by JOHN DOUGALL 350
Asepsis and Antisepsis in Rydygier's Clinique 77
Asthma in relation to the Upper Air Passages, by P. M'BRIDE . 7

BACILLUS Typhosus and Bacillus Coli Communis, by R. W. MACKENNA 399

PAGE
Bacteriological Science, The Advance of, in the Diagnosis and Prevention of Disease . . 468
Bacteriology, Some Recent Applications of, to Clinical Medicine, by E. J. CAVE 148
BAIN, WM., The Relative Excretion of the Nitrogenous Waste Products in a Case of Liver Abscess 334
BALFOUR, A., and PORTER, C., The Bacteriology of Typhus Fever . 522
Barbour, A. H. F., The Anatomy of Labour, as studied in Frozen Sections. *Review* . . . 274
BARLING, GILBERT, Appendicitis: The Results of Operation in 117 Cases, with some Considerations on the Questions of Diagnosis, of Recurrence, and of Mortality . 493
BAYLISS, R. A., Acute Rheumatoid Arthritis 160
BEARD, J., Outlines of Zoology, by J. Arthur Thomson. *Review* . 66
BEATSON, G. T., Observations on the Existence of Enzymes in Cancerous Growths . . . 393
Bees, Acquired Immunity to the Poison of 82
BELL, W. B., Spasmodic Asthma. 339
BERRY, R. J. A., Handbook of Anatomy for Art Students, by A. Thomson. *Review* . . 548
Bifocal Lenses 569
Birch, De Burgh, Class-Book of (Elementary) Practical Physiology. *Review* 168
BISHOP, E. STANMORE, Three Cases of Ureteral Calculi Impacted in the Lower End of the Ureter, and removed by Suprapubic Cystotomy 47
Blackwater Fever, The Parasite of Malaria in the Tissues in a Fatal Case of 87
Blastomycetes, On the Pathogenic Action of 87
Bleeders, Treatment of the Joint Lesions in 279
Blindness after Ligature of the Carotid 569
Blood Pressure, Effects of Baths, Massage, and Exercise on the . 82
Boston City Hospital, Medical and Surgical Reports of. *Review* . 452
Bowel, Diagnosis of Strictures of the 367
BRAMWELL, BYROM, Anæmia and some of the Diseases of the Blood-forming Organs and Ductless Glands. *Review* . . . 361
British Medical Association, Annual Meeting of the 204
Bromides, Action of . . . 565

PAGE
BROWN, A. CRUM, Dr. John Mayow: The Harveian Oration for 1899 116
Brown, H., Ringworm and other Scalp Affections. *Review* . . 549
BRUNTON, T. L., Jaundice in some of its Aspects 309
BUNCH, J. L., On Mouth Breathing 56
Bursæ in the Region of the Hip, and their Diseases . . . 176

CABOT, R. C., Serum Diagnosis of Disease. *Review* . . . 169
Cæsarean Section, with Transverse Incision of the Fundus Uteri . . . 282
,, After Vaginal Fixation 371, 372
,, Three Conservative, on the same Patient . 79
CAMPBELL, H. J., Pulmonary Tuberculosis in Young Children 259
Cancer Parasite 291
Cancerous Growths, Observations on the Existence of Enzymes in, by G. T. BEATSON . . . 393
CANT, W. J., Case of Perforated Gastric Ulcer 267
Carbonic Oxide in Blood, The Detection of 378
Cardiac Strain in Adolescence and in Middle Age, by I. BURNEY YEO 11
CARTER, GODFREY, Etiology of Graves's Disease . . . 343
Cataract, Tetany in . . . 300
CATON, R., System of Medicine by many Writers, edited by T. Clifford Allbutt. *Review* . 165, 447
CAVE, E. J., Some Recent Applications of Bacteriology to Clinical Medicine 148
Central Nervous System, Malaria of the 466
Cherbourg, Enteric Fever at . . 193
Chest Disease, A Scottish Sanatorium for . . 483
,, Exploratory Puncture of, Pulmonary Hæmorrhage following . . . 385
Cheyne, W. Watson, and F. F. Burghard, Manual of Surgical Treatment. *Review* . . . 450
Children, Diet of . . . 276
Chloral Hydrate, in Nervous Dyspepsia 506
Chlorinated Lime, The Sterilisation of Water by . . . 479
Chlorine Acne 183
Chloroform Anæsthesia, Late Deaths after . . 370
,, Narcosis in Children . 285
Chlorosis, Etiology of . . . 373

PAGE

Cholangitis Typhosa and Cholecystitis 174
Cholecystitis and Cholangitis Typhosa 174
Cholera at Camaran . . . 477
Chrysarobin as a Cure for Warts . 567
Clarke, J. J., Orthopædic Surgery. *Review* 553
Clavicle, Deformity from Dislocation and Fracture of the . . 368
Clinch, T. A., *see* Jones . . 432
Cohn, T., Leitfaden der Electrodiagnostik und Electrotherapie. *Review* 363
Colon Bacillus, On the Diplococcoid Form of the . 467
,, and Phantom Tumours, Idiopathic Dilatation of the . . . 366
,, Traumatic Rupture of the 368
Copeman, S. M., Vaccination: its Natural History and Pathology. *Review* 356
Cornea, Tattooing of the . . 570
Corpulence, Treatment of . . 463
Corrosive Sublimate, Passage of, through the Placental Circulation 377
Cystinuria 457
Cystotomy 369

Dacryo-Cystitis in Infants . 297
Dextrose, The Relation of, to the Production of Toxin in Bouillon Cultures of the Diphtheria Bacillus 466
Diabetes, Copaiba in . . . 286
Diabetic Coma, Sodium Bicarbonate in 284
Diet of Children 276
Diphtheria 466
,, Bacillus, Relation of Dextrose to the Production of Toxin in Bouillon Cultures . 466
,, Toxin, Action of, on the Heart . . . 81
Diphtheritic Paralysis . . . 384
Disease, The Advance of Bacteriological Science in the Diagnosis and Prevention of . . . 468
Dougall, John, An Unusual Case of Ascites 350
Drowning, Œdema of the Larynx in 376
Duffett, H. A., Two Cases showing the Effect of Extreme Cold on Injury 539
Dunlop, G. H. M., Wasting Diseases of Infants and Children, by Eustace Smith. *Review* . 545
Dunlop, G. H. M., Diseases of Children, by J. M'Caw. *Review* 546
Dunlop, J. C., Report on Prison Dietaries. *Review* . . . 551
Dyspepsia, Chloral Hydrate in some Forms of Nervous . . 566

Ear Disease, Suppurative, A Contribution to the Statistics of the Dangerous Complications of . 473
Eclampsia 80
Ectopic Gestation, Repeated, in the same Patient, by John Edgar and J. H. Teacher . . . 34
Eczema, Etiology of . . . 380
,, of Children, Arsenic in . 184
Edgar, John, and J. H. Teacher, Repeated Ectopic Gestation in the same Patient . . . 34
Elder, G., and J. S. Fowler, Diseases of Children. *Review* . 363
Encyclopædia Medica, edited by Chalmers Watson, vol. i. *Rev.* 442
Enteric Fever 478
,, at Cherbourg . . 193
,, in Paris . . . 479
Epilepsy, Causation and Treatment of Traumatic . . . 280
Erysipelas and Allied Diseases, by J. T. Maclachlan . 129
,, Treatment of . . 185
Erythema Induratum, Lesions and Nature of 383
Ethmoidal Cells, Orbital Complications of Empyema of the . . 571
Exophthalmic Goitre . . . 454
,, as a Manifestation of Hysteria . . . 455
,, Muscular Lesions in . 456
,, Section of the Sympathetic in . . 456
,, Simulated by Iodism . 457
,, Trophic Troubles in . 456
Extra-uterine Gestation rupturing into the Bladder . . . 369
Eye, Chestnut Thorn Injuries to the 299
,, Multiple Images in the Normal 299
,, Prevention of Accidents to the 567

Female Genitals, Experiments on the Sensory Capacity of, from a Forensic Point of View . . 283
Fenwick, E. Hurry, Primary Malignant Disease of Prostate Gland . 16
,, The Plastic Repair of Urethro - Perineo-Scrotal Fistulæ . 419

PAGE

FERGUSON, J. HAIG, Observations on Labour, complicated by a Minor Degree of Pelvic Contraction in Primiparæ and Multiparæ 41

Filix Mas as an Anthelmintic . 462

FISHER, T., Some Points of Interest in the Morbid Anatomy of the Aortic Valve 414

FLEMING, R. A., Methods of Staining the Nervous System, by B. Pollack. *Review* . . 171

Fœtus, Transmission of the Agglutinative Power of the Blood to the, in Typhoid Fever . . 291

Formalin in the Treatment of Surgical Tuberculosis . . 176

Frontal Sinuses, Intracranial Infection following Empyema of the 192

GARROD, A. E., Atlas of Urinary Sediments, by H. Rieder. *Rev.* 543

GEMMEL, J. F., Pericarditis and Ulcerative Endocarditis secondary to Empyema . . . 439

Giant Cells and the Absorption of Coagulated Blood Serum . . 292

GIBSON, G. A., Acromegaly . . 505

,, Principles of Reflex Action . . . 318

Glaucoma, Treatment of, by Resection of the Sympathetic . 570

GILLESPIE, A. L., Dictionary of Medical Terms, by H. de Méric. *Review* 274

,, Wesen, Ursache und Behandlung der Zuckerkrankheit (Diabetes Mellitus), by A. Lenné. *Rev.* . 275

,, Leitfaden der Electrodiagnostik und Electrotherapie, by T. Cohn. *Review* . 363

,, Medical and Surgical Reports of the Boston City Hospital. *Rev.* 452

,, Diseases of the Stomach, by W. van Valzah. *Review* . . . 544

,, The Diagnosis of Disease, by J. P. Parkinson. *Review* . 453

Glasgow Western Infirmary, Abdominal Sections in, from 1894 till 1897 81

Glycosuria, Phloridzin . . . 556

,, with Acromegaly . . 556

Gonococcus, Activity of the . . 87

Gonorrhœa, Complications of . 288

,, Diagnosis of . . 290

PAGE

Graves's Disease, The Etiology of, by GODFREY CARTER . . . 343

Greenish, H. G., An Introduction to the Study of Materia Medica. *Review* 357

Gynæcology, Rectal Irrigation in . 461

HÆMOGLOBINURIA, with Acromegaly 556

Haffkine's Plague Vaccine, Inoculation of a Community with . 292

HAILES, C. D. G., The Clinical Aspect of Iritis 326

HAULTAIN, F. W. N., Short Practice of Midwifery, by Henry Jellett. *Review* . . . 170

Heart, Action of Diphtheria Toxin on the 81

,, Disease, Sulphate of Spartein in 286

Helferich, H., On Fractures and Dislocations. *Review* . . 70

HELLIER, J. B., Diseases of Children, by G. Elder and J. S. Fowler. *Review* . . . 363

Hernia, An Operation for the Radical Cure for, by C. A. STURROCK 353

Hill, Leonard, Manual of Human Physiology. *Review* . . 358

Hip, Bursæ in the region of the, and their Diseases . . . 176

Hot Air Treatment of Disease, by SAMUEL HYDE 421

Hueppe, F., The Principles of Bacteriology. *Review* . . . 359

Huntington's Chorea . . . 188

HUTCHINSON, J., Jr., Atlas of Syphilis and the Venereal Diseases, by F. Mracek. *Review* . 172

HYDE, SAMUEL, The Hot Air Treatment of Disease . . 421

Hyoscin, Action of . . . 464

Hypnotism in Alcoholism and Sexual Perversion 470

Hypospadias, Tunnelisation of the Penis in the Treatment of. . 75

Hysteria, Exophthalmic Goitre as a Manifestation of . . . 456

Hysterical Phenomena . . . 469

IMPETIGO CONTAGIOSA . . . 379

Incontinence of Urine, A Patient's Device for. 78

Infectious Diseases . . . 73

Infective Endocarditis. Remarks, with Illustrative Cases, by R. KIRKLAND 251

Injury, Two Cases showing the Effect of Extreme Cold on, by H. A. DUFFETT . . . 539

Innominate Bone and Lower Extremity, Removal of the . . 559

PAGE

Intermittent Fever, Observations on a Case of, by J. O. AFFLECK and D. A. WELSH . . . 105
Interscapulo-Thoracic Amputation 558
Intracellular Secretions . . 293
Iodine in the body after giving Potassium Iodide . . . 286
Iodism, Exophthalmic Goitre simulated by 457
Iritis, The Clinical Aspect of, by C. D. G. HAILES . . . 326
Iron, Action of, and Etiology of Chlorosis 373

JAKSCH, von, Clinical Diagnosis. *Review* 270
JAMIESON, W. ALLAN, Zur Austilgung der Syphilis, by E. Kromayer. *Rev.* 68
,, Ringworm, by H. Brown. *Review* . 549
,, Transactions of the American Dermatological Association. *Review* . . . 272
Jaundice in some of its Aspects, by T. LAUDER BRUNTON . . 309
Jellett, Henry, Short Practice of Midwifery. *Review* 170
Joint Lesions, Treatment of, in Bleeders 279
Joints, Loose Bodies in . . 279
,, Swellings of, with Acromegaly 556
JONES, R. L., and T. A. CLINCH, Palpation of the Pancreas in Splanchnoptosis (Glénard's Disease) 432

KELYNACK, T. N., The Pathology of Renal Tumours . 233
,, Renal Growths, their Pathology, Diagnosis and Treatment. *Rev.* 268
KER, CLAUDE, *see* LITTLEJOHN . 23
KIRKLAND, R., Infective Endocarditis. Remarks, with Illustrative Cases 251
Kraepelin, E., Psychiatrie. *Review* 67
Kromayer, E., Zur Austilgung der Syphilis. *Review* 69

LABOUR at Twelve Years, with Complications . . . 182
,, Case of Sudden Death in . 79
,, Observations on, complicated by a Minor Degree of Pelvic Contraction, in Primiparæ and Multiparæ, by J. HAIG FERGUSON 41
Lachrymal Sac, Extirpation of the 298

PAGE

LANE, W. ARBUTHNOT, Some Points in the Mechanics of the Skeleton 209
Laparotomy in an unusual Case . 460
Larynx, Mycosis of the . . 191
,, Œdema of the, in Drowning 376
Lenné, A., Wesen, Ursache und Behandlung der Zuckerkrankheit (Diabetes Mellitus). *Review* . 275
Leucocytes, Action of Sudorifics and Anhidrotics on . . . 184
Lewis, W. Bevan, Text-Book of Mental Diseases. *Review* . 63
Light, The Treatment of Disease by 89
LITTLEJOHN, HARVEY, Medico-Legal Notes . . 222
,, Modern Cremation, by Sir H. Thompson. *Review* . 533
,, and CLAUDE B. KER, An Outbreak of Typhus Fever . 23
Liver, Resection of the, for Cancerous Tumour . . . 539
,, Syphilis and the . . 84
Lockwood, C. B., Aseptic Surgery. *Review* . . . 547
,, Radical Cure of Hernia. *Review* . . . 546
Lymphatic Glands in the Groin and Iliac Fossa, Extirpation of the . 459

M'BRIDE, P., Asthma in relation to the Upper Air Passages . 7
M'Caw, J., Diseases of Children. *Review* 546
M'GREGOR, G. SCOTT, Cases illustrative of Syphilitic Meningo-Myelitis 242
MACKENNA, R. W., Bacillus Typhosus and Bacillus Coli Communis 399
MACKENZIE, HECTOR, Clinical Diagnosis, by von Jaksch. *Review* . 270
,, Diabetes Mellitus and its Treatment, by R. T. Williamson. *Review* . . . 271
"Encyclopedia Medica," edited by Chalmers Watson, vol. i. *Review* . 443
MACKENZIE, W. LESLIE, Annual Report of the Medical Officer of Health of the City of Edinburgh for the Year 1898. *Review* . 65
MACLACHLAN, J. T., Erysipelas and Allied Diseases . . . 129
MACPHERSON, J., Text-Book of Mental Diseases, by W. Bevan Lewis. *Review* . 63

PAGE
Macpherson, J., Psychiatrie, by E. Kraepelin. *Review* . . . 67
Malaria of the Central Nervous System 466
Malarial Spleen, Excision of the . 179
Mallory, F. B., and J. H. Wright, Pathological Technique. *Review* 360
Mayow, Dr. John, by A. Crum Brown 116
Mechanics of the Skeleton, Some Points in the, by W. Arbuthnot Lane 209
Medical Education in the United Kingdom . . . . . i–xxxvi
Medico-Legal Notes, by Harvey Littlejohn 222
Méric, H. de, Dictionary of Medical Terms. *Review* . . . 274
Miller, A. C., Accident in which a Crowbar traversed the Vertical Diameter of Patient's Abdominal Cavity: Survival for Three Weeks 264
Milroy, T. H., Class-book of (Elementary) Practical Physiology, by De Burgh Birch. *Rev.* 168
,, Elementary Physiology, by B. Moore. *Rev.* 358
,, Manual of Human Physiology, by Leonard Hill. *Review* . 358
Moore, B., Elementary Physiology. *Review* 358
Monthly Notes on Meteorology and Vital Statistics 103, 202, 307, 391, 491, 581
Morison, Rutherford, Pyloroplasty 140
Mouth Breathing, by J. L. Bunch 56
Mracek, F. Atlas of Syphilis and the Venereal Diseases. *Review*. . 172
Muir, Robert, and James Ritchie, Manual of Bacteriology. *Review* . 168
,, Pathological Technique, by F. B. Mallory and J. H. Wright. *Review* . . . 360
,, Vaccination, by S. M. Copeman. *Review* . 356
Mumps of the Testicles . . 175
Muscular Lesions in Exophthalmic Goitre 456
Mycosis of the Larynx . . . 191
Mydriatics and Myotics, Action of 184
Myxœdema, Death from Exophthalmic Goitre along with . . 454

Necrosis following Acute Osteomyelitis, Treatment of . . 557
Nephritis complicating Acute and Subacute Gastro-Enteritis of Children 95
Nephrostomy for Anuria, resulting from Uterine Cancer . . . 178
Ness, R. B., An Introduction to the Study of Materia Medica, by H. G. Greenish. *Review* . . 357
Night-Blindness 568
Nitrogenous Waste Products, The Relative Excretion of the, in a Case of Liver Abscess, by Willaim Bain . . . 334
Novy, F. G., Laboratory Work in Bacteriology. *Review* . . 167

Obituary—
Lawson Tait, 98; Robert Moir, 99; J. G. Sinclair Coghill, 99; Norman Kerr, 100; Sir Alex. Armstrong, 199; Sir W. H. Flower, 199; John Duncan, 389; Surgeon-Major General Lithgow, 482; W. M. Hutton, 483; W. C. Arnison . . 580
Oliphant, E. H. L., The Anatomy of Labour, as studied in Frozen Sections, by A. H. F. Barbour. *Review* . . . 274
Ophthalmia Neonatorum, Protargol as a Substitute for Silver Nitrate in 327
Osteomyelitis, Treatment of Necrosis following Acute . . 557
Ovum, Adhesion of a Lower Pole of, as a Cause of Delayed First Stage 180

Pancreas, Palpation of the, in Splanchnoptosis (Glénard's Disease), by R. L. Jones and T. A. Clinch 432
Paralysis in Young Children . 93
Parkinson, J. P., The Diagnosis of Disease. *Review* . . . 453
Perforated Gastric Ulcer, a Case of, by A. J. Cant 267
Pericarditis and Ulcerative Endocarditis, secondary to Empyema, by J. F. Gemmel . . . 439
Peri-urethral Suppurations, Bacteriology of 178
Petro-Squamosal Sinus . . 476
Phloridzin Glycosuria and the Clinical Examination of Renal Functions 556
Phosphorus Poisoning in Lucifer Match Manufactories . . 194
Placental Circulation . . . 377
Pollack, B., Methods of Staining the Nervous System. *Review* . 171
Potable Water, Sterilisation of, by Ozone 196
Potassium Iodide, Elimination of 83
Potts, W. A., Case of Recovery after drinking Half an Ounce of Liniment of Aconite . . 541

PAGE
Pregnancy, Full Term, and Two Months' Abortion in the same Woman, with Two Days' Interval 79
Prostate Gland, Primary Malignant Disease of the, by E. Hurry Fenwick 16
Protargol in Rhinological and Laryngological Practice 190
,, Styles of 298
Psoriasis of the Tongue, Treatment of 78
Puerperal Infection, Antistreptococcic Serum in the Treatment of 563
,, Psychoses 185
Pulmonary Hæmorrhage following Exploratory Puncture of the Chest 385
,, Tuberculosis in Young Children, by H. J. Campbell 259
Pupillary Reflex Centres 471
Pyloroplasty, by Rutherford Morison 140

Railway Carriages, Protection against Infection in 477
Ramsay, A. Maitland, Strumous Ophthalmia 1

Recent Advances in Medical Science—
Dermatology, by W. Allan Jamieson 89, 379
Diseases of Children, by G. H. Melville Dunlop 93, 383
,, of Ear, Nose, and Throat, by P. M'Bride and A. Logan Turner 189, 473
,, of the Eye, by George A. Berry and W. G. Sym 296, 567
Insanity, by Sir John Batty Tuke and John Macpherson 185, 469
Medical Jurisprudence, by Harvey Littlejohn 376
Medicine, by A. Lockhart Gillespie 70, 172, 277, 365, 454, 554
Obstetrics and Gynæcology, by F. W. N. Haultain 79, 180, 282, 371, 460, 562
Pathology and Bacteriology, by R. F. C. Leith 84, 288, 464
Physiology, by T. H. Milroy 293
Public Health, by Charles Hunter Stewart 193, 477
Surgery, by Alexis Thomson 75, 176, 278, 368, 457, 557
Therapeutics, by Ralph Stockman 81, 183, 284, 373, 462, 565

PAGE
Rectal Irrigation in Gynæcology 461
Reflex Action, Principles of, by G. A. Gibson 318
Renal Catheter, Use of, in Determining the Seat of Obscure Pain in the Side 562
,, Hæmaturia, "Essential" 370
,, Tumours, The Pathology of, by T. N. Kelynack 233
Report on Bacterial Treatment of Crude Sewage, to London C. C. *Rev.* 549
,, of the Medical Officer of Health of the City of Edinburgh, for the year 1898. *Review* 65

Reports of Societies—
Edinburgh Medico-Chirurgical Society 97, 197, 573
,, Obstetrical Society 97, 198, 573
Forfarshire Medical Association 481, 574
Glasgow Pathological and Clinical Society 574
Rheumatoid Arthritis, Acute, by R. A. Bayliss 160
Rieder, H., Atlas of Urinary Sediments. *Review* 543
Ritchie, James, The Serum Diagnosis of Disease, by R. C. Cabot. *Review* 169
Roberts, Leslie, Introduction to Dermatology, by Norman Walker. *Review* 550
Robson, A. W. Mayo, The Relation of Typhoid Fever to Diseases of the Gall Bladder, with a Reference to the Bacterial Origin of Gall Stones 218
Röntgen Rays, Recognition of Urinary Calculi by the 75
,, Sloughing Ulcers caused by the 458
Rose, Wm., and Albert Carless, Manual of Surgery. *Review* 61
Rosenberg, A., Die Krankheiten der Mundhöhle, des Rachens und des Kehlkopfes. *Review* 169
Rydygier's Clinique, Asepsis and Antisepsis in 77

Scarlet Fever 173
Sexual Perversion, The Use of Hypnotism in 470
Shoulder and Arm, Traumatic Paralysis of the 560
Skeleton, Some Points in the Mechanics of the, by W. Arbuthnot Lane 209
Sloughing Ulcers 458

PAGE

Smith, Eustace, Wasting Diseases of Infants and Children. *Review* 545
Smith, G. B., Aseptic Surgery, by C. B. Lockwood. *Review* . . . 547
,, Fractures and Dislocations, by H. L. Helferich. *Review* . 70
,, Radical Cure of Hernia, by C. B. Lockwood. *Review* . . . 546
Smith, J. Lorrain, Laboratory Work in Bacteriology, by F. G. Novy. *Review* . . . 167
Sodium Salicylate, Elimination of 83
Spasmodic Asthma, by W. B. Bell 339
Spinal Cord, Cocainisation of the . 558
Spleen, Excision of, for Malarial Disease 179
Spreading Gangrene . . . 278
Stewart, C. Hunter, Report on Bacterial Treatment of Crude Sewage. *Review* . . . 549
Stiles, Harold J., Manual of Surgery, by Wm. Rose and A. Carless. *Review* . . . 61
Stockman, Ralph, Anæmia and some of the Diseases of the Blood-forming Organs and Ductless Glands, by Byrom Bramwell. *Review* . 361
,, Report on Prison Dietaries, by J. C. Dunlop. *Review* . . 551
Strumous Ophthalmia, by A. Maitland Ramsay 1
Sturrock, C. A., An Operation for the Radical Cure of Hernia . 353
Stypticin, The Use of 460
Summer Diarrhœa in Infants, Treatment of . . . 373, 383
Sympathetic Nerve, Results of Section of the, in Exophthalmic Goitre 456
Synovial Membranes, Elimination of Sodium Salicylate and Potassium Iodide by the . . . 83
Syphilitic Meningo-Myelitis, Cases illustrative of, by G. Scott MacGregor 242
Syphilis 71
,, and the Liver . . . 84

Tattooing of the Cornea . . 570
Teacher, J. H., *see* Edgar . . 34
Terrier, F., and H. Hartmann, Chirurgie de l'Estomac. *Review* 362
Testicles, Mumps of the . . 175
Testicular Tuberculosis, Treatment of 177
Tetany and Cataract . . . 300

PAGE

Tetany in Children . . . 94
Therapeutic Gleanings . . . 91
Thomson, Alexis, Orthopædic Surgery, by J. J. Clarke. *Review* 553
Thomson, Arthur, Handbook of Anatomy for Art Students. *Review* 548
Thomson, J. Arthur, Outlines of Zoology. *Review* . . . 66
Thomson, Sir H., Modern Cremation. *Review* 553
Thrombosis in the Veins of the Lower Extremity after Abdominal Operations, Prevention of .. 76
Tongue, Psoriasis of the . . 78
Trachoma, Racial Distribution of . 296
Transactions of the American Dermatological Association. *Review* 272
Transplantation of Skin by Krause's Method 371
Treves, F., Intestinal Obstruction. *Review* 451
Trophic Troubles in Exophthalmic Goitre 456
Tubercle Bacilli, Thermal Death Point of, in Milk and some other Fluids 292
Tuberculosis, Formalin in the Treatment of Surgical . 176
,, in Children . . 386
,, Treatment of Testicular 177
,, Uterine, Treatment of, by Drugs 287, 564
Tuberculous Sputum, Influence of Sunlight on 86
Turner, A. Logan, Die Krankheiten der Mundhohle, etc., by A. Rosenberg. *Review* . . 169
Turner, H. S., Case of Obstruction of Wharton's Duct . . 436
Typhoid Fever, The Relation of, to Diseases of the Gall Bladder, with a Reference to the Bacterial Origin of Gall Stones, by A. W. Mayo Robson . . 218
,, Transmission of the Agglutinative Power of the Blood to the Fœtus in . . . 291
Typhus Fever, An Outbreak of, by Harvey Littlejohn and Claude B. Ker 23
,, The Bacteriology of, by A. Balfour and C. Porter . . . 522

Ulcers caused by the Röntgen Rays 458

PAGE

Ulcers, Gastric and Duodenal, Surgical Treatment of Hæmorrhage from 179
Uræmia and Chloride of Sodium . 535
Urethro-Perineo-Scrotal Fistulæ, The Plastic Repair of, by E. HURRY FENWICK . . . 419
Urethrotomy for Stricture, A Case of, by MARK WARDLE . . 268
Ureter, Villous Growths of the . 458
Ureteral Calculi impacted in the Lower End of the Ureter, and removed by Suprapubic Cystotomy, Three Cases of, by E. STANMORE BISHOP . . . 47
Uric Acid, Influence of Certain Drugs on . . . 83
,, Formation and Decomposition of . . 295
Urinary Calculi, Recognition of, by the Röntgen Rays . . 75
Urine, A Patient's Device for Paralytic Incontinence of, 78
,, Partial Retention of, its Consequences and Treatment, by A. A. WARDEN . . . 53
,, Reaction of the . . 365
,, Tests for Albumoses in . 554
Uterine Carcinoma, New Method for Operating for . . 564
,, Inversion, Conservative Surgical Treatment of . 283
,, Retro-displacements . 181
,, Tuberculosis . . . 564

VAGINAL Fixation, Cæsarean Section after . 371, 372
,, Secretion of Healthy Pregnant and Puerperal Women, Are Streptococci present in the? . . . 182
Valzah, W. Van, Diseases of the Stomach. *Review* . . . 544
Varicose Ulcers of the Leg, Nerve-stretching in 370

WALKER, N., Introduction to Dermatology. *Review* . . 550

PAGE

WARDEN, A. A., Partial Retention of Urine: Its Consequences and Treatment 53
WARDLE, MARK, A Case of Urethrotomy for Stricture . 268
Warts, Chrysarobin as a Cure for . 567
Water, Sterilisation of, by Chlorinated Lime 479
WATERHOUSE, H. F., Atlas and Epitome of Operative Surgery, by Otto Zuckerkandl. *Rev.* . 273
,, Chirurgie de l'Estomac, by F. Terrier and H. Hartmann. *Review* 362
,, Die Localen Erkrankungen der Harnblase, by Otto Zuckerkandl. *Review* . . . 364
,, Intestinal Obstruction, by F. Treves. *Rev.* 451
,, Manual of Surgical Treatment, by W. Watson Cheyne and F. F. Burghard. *Review* . . . 450
WELSH, D. A., *see* AFFLECK . 105
Wharton's Duct, Case of Obstruction of, by H. S. TURNER . . 436
Williamson, R. T., Diabetes Mellitus and its Treatment. *Rev.* . 271
WOOD, G. E. C., The Principles of Bacteriology, by F. Hueppe. *Review* 359
WOODHEAD, G. SIMS, Manual of Bacteriology, by Robert Muir and James Ritchie. *Rev.* 168
,, Renal Growths, by T. N. Kelynack. *Review* . 268

YELLOW Fever, Specific Cause of . 464
YEO, I. BURNEY, on Cardiac Strain in Adolescence and in Middle Age 11

ZUCKERKANDL, OTTO, Atlas and Epitome of Operative Surgery. *Review* . 273
,, Die Localen Erkrankungen der Harnblase. *Review* . . 364

MEDICAL EDUCATION IN THE UNITED KINGDOM.

I. Education in General.

Before describing the requirements imposed upon all those who desire to obtain a degree or diploma with the right to practise medicine and surgery, a word may well be said about the important questions—Which degree or diploma to work for? and which teaching institution to attend? There are three courses open to the aspirant to medical honours. He may enter a university which affords education as well as confers degrees; he may study at certain medical schools, and take his degree at a university which does not possess a teaching staff; or he may enter for one of the licences to practise granted by certain medical bodies. A university degree has certainly greater credit associated with it, but now that a minimum course of study, lasting for at least five years, and including a large number of compulsory classes, has been made obligatory upon all graduates and licentiates alike, the difference between the instruction provided by the universities and by the different medical schools is not so great as formerly.

As a rule, the total cost incurred during the period of study for a college diploma is not so high as that for a university degree. The charges, however, vary greatly in the different schools and universities, nor can the minimum cost of a curriculum at any of them be accurately estimated. The usual sum for the class and degree fees spread over the five years is about £150 to £160, when necessary extras are included.

The table on the following page gives approximately the minimum cost of obtaining the different degrees and diplomas.

The exact expense incurred during the period of professional training for these degrees and diplomas varies according to the school attended.

The fees at the different London hospitals can be compounded for by one or two payments, the sum of which is less than the total if paid by annual instalments. The curriculum for the London Colleges' diplomas costs from £110 to £158, exclusive of the examination fees. If the London University M.B. course is taken, the cost is somewhat greater. The degrees of the Scottish Universities cost, with the examination fees, from £115 to £145; the licence of the Scottish Colleges, from £115 to £130.

TABLE I.—*The Approximate Cost of the Minimum Curriculum for Degrees and Diplomas of the Universities and Medical Schools.*

	Diplomas.	Class Fees.	Examination Fees, etc.	Total.
1. TEACHING UNIVERSITIES.				
Edinburgh	M.B., Ch.B.	£115 0	£28 7	£143 7
Glasgow	M.B., Ch.B.	97 13	28 7	126 0
Aberdeen	M.B., Ch.B.	90 0	23 2	113 2
Dublin	B.A., M.B., B.Ch., B.A.O.	207 12	27 0	234 12
Durham	M.B.	115 0	26 0	141 0
,,	M.B., B.S.	115 0	31 0	146 0
Victoria University	M.B., Ch.B.	138 6	17 0	155 6
Oxford	B.A., B.M., B.Ch.	165 0	30 0	£165–£220
Cambridge	M.B., B.C.	150 0	20 0	£150–£200
2. NON-TEACHING UNIVERSITIES.				
London	M.B., B.S.	£150 0	£17 0	£167 0
Royal, Ireland	M.B., B.Ch., B.A.O.	145 0	17 0	162 0
3. LICENSING BODIES.				
Conjoint Scottish Qualification	L.R.C.P.E., L.R.C.S.E., and L.F.P.S.Glasg.	£90 0	£30 0	£120 0
Conjoint English Qualification	L.R.C.P. Lond., and M.R.C.S. Eng.	£90-£120	36 15	£126–£156
Mason University College	Do.	£133 18	36 15	£170 13
Society of Apothecaries	L.S.A.	£90 0	15 0	£105 0
Conjoint Irish Qualification	L.R.C.P.I., and L.R.C.S.I.	135 0	42 0	172 0
Apothecaries' Hall	L.A.H.	90 0	22 1	112 1

At the provincial medical schools in England the college expenses for the London Colleges' diploma are—Mason University College, Birmingham, £133; Owens College, Manchester, £115, 3s.; about the same sum at University College, Sheffield; £123 at University College, Bristol; £115, 10s. at the Yorkshire College, Leeds; £125 at the University College, Liverpool.

For the London University degree, £25 will, as a rule, require to be added to these figures, to cover the fees for classes necessary for the Preliminary Scientific Examination.

In Ireland, the Dublin University only confers the M.B., B.Ch., B.A.O. degree on Bachelors of Arts; the cost therefore is considerably higher than elsewhere. The expense incurred while working for the Irish diplomas comes to about £140 in Dublin, but is much less than this at any of the Queen's Colleges, whether at Belfast, Cork, or Galway. The degree of the Royal University of Ireland costs £165 at the Catholic University School of Medicine in Dublin; the diploma of the conjoint colleges, £166.

The fees for lectures and examinations, therefore, vary from about £115 to £200; and, adding the cost of books, instruments, and club subscriptions for the five years, say £30, and of maintenance during thirty-nine weeks each year, £300, we get a total expense, solely connected with the curriculum, of from £445 to £530. This estimate is the utmost minimum; in most cases a sum of £1000, or over it, will be spent in the five years.

II. THE REGULATIONS OF THE GENERAL MEDICAL COUNCIL, BINDING ON ALL THOSE ENTERING UPON THE FIVE YEARS' COURSE OF MEDICAL STUDY, CONSTITUTING THE MINIMUM COURSE ALLOWED FOR GRADUATION OR LICENCE.

A. *Preliminary Examination and Registration.*

Before any one can register as a medical student, from which the commencement of his five years' course is calculated, he must pass a preliminary examination in the subjects of general education, or an examination recognised by the General Medical Council as equivalent to it. (Cf. Table II., pp. iv.–vii.)

A preliminary examination certificate is only accepted by the Council as entitling to registration, provided that it certifies that all the required subjects have been passed at one and the same time.

The student now enters his name on the books of a university or college, receives a certificate to this effect, and forwards the certificate, along with that for the preliminary examination, and a form of application for registration in the books of the General Medical Council (to be obtained from the registrars of the Council), filled up according to the instructions printed on it, to the registrar of the Branch Council for the district in which his school is situated. If this is not done within *fifteen days* from the commencement of a session, the classes taken during that session will not be recognised as qualifying for graduation. (For the names and addresses of the registrars, see p. xxiii.)

B. *Professional Education.*

The student is now officially recognised as having commenced the professional study of medicine, and is required to spend at least five years over it, of which the last year must be devoted to clinical work. Before he can enter for any of the examinations, he must produce certificates, not only to show that he has attended the necessary classes, and paid the necessary fees, but that he has given satisfaction to his teachers by his conduct, and taken part in the class examinations held during the sessions. The minimum attendance on classes which constitutes an *annus medicus* is fixed at two courses of lectures during each session, or one course of lectures and hospital practice.

Graduates in Arts or Science of any university recognised by the Medical Council, who shall have spent a year in the study of physics, chemistry, and biology, and have passed an examination in these subjects for the degrees in question, shall be held to have completed the first of the five years' of medical study.

TABLE II.—*List of Examining Bodies whose Examinations in General Education are recognised by the Medical Council as qualifying for Registration as Medical or Dental Student.*

Testimonials of proficiency granted by educational bodies, according to the subjoined list, will be accepted by the Council, which reserves the right to add to or take from the list.

A Degree in Arts of any university of the United Kingdom, or of the colonies, or of such other universities as may be specially recognised from time to time by the Medical Council, is considered a sufficient testimonial of proficiency.

I. UNIVERSITIES IN THE UNITED KINGDOM.

Universities of Oxford, Cambridge, and Durham:—

(1) Junior Local Examinations (certificate to include all the required subjects at one time).
(2) Senior Local Examinations (certificates to include the required subjects).
(3) Responsions (certificate to be supplemented by others showing that the required mathematical subjects have been passed). Oxford.
(4) Moderations (certificates to include the required subjects). Oxford.
(5) Final Examination for a Degree in Arts.
(6) Higher Local Examinations (certificates to include the required subjects). Cambridge.
(7) Previous Examination (certificates to include the required subjects). Cambridge.
(8) General Examination (certificates to include the required subjects). Cambridge.
(9) Examination for Certificate of Proficiency (certificate to include all the required subjects at one time). Durham.
(10) Preliminary Examination in Arts for Graduation in Medicine and Science (certificate to include the required subjects). Durham.

Universities of London and Wales, and Victoria University:—

(11) Matriculation Examination (certificate to include the required subjects). London.

(12) Final Examination for a Degree in Arts or Science.

(13) Preliminary Examination (certificate to include all the required subjects at one time). Victoria.

(14) Entrance Examination in Arts (certificate to include all the required subjects at one time). Victoria.

(15) Matriculation Examination (certificate to include all the required subjects at one time). Wales.

Universities of Edinburgh, Aberdeen, Glasgow, and St. Andrews:—

(16) Junior Local Examination (certificate to include all the required subjects at one time). Edinburgh and Aberdeen.

(17) Senior Local Examination (certificates to include the required subjects). Edinburgh and Aberdeen.

(18) Preliminary Examination for Graduation in Medicine and Surgery (certificate to include the required subjects).

(19) Preliminary Examination for Graduation in Arts or Science (certificate to include the required subjects).

(20) Final Examination for a Degree in Arts or Science.

(21) Final Examination for the Diploma of L.L.A. St. Andrews.

University of Dublin:—

(22) Public Entrance Examination (certificate to include the required subjects).

(23) Examination for the First, Second, Third, or Fourth Year in Arts (certificate to be signed in the approved form by the medical registrar of the university).

(24) Final Examination for a Degree in Arts.

Royal University of Ireland:—

(25) Matriculation Examination (certificate to include the required subjects).

(26) Final Examination for a Degree in Arts or Science.

Oxford and Cambridge Schools' Examination Board:—

(27) Lower Certificate (to include all the required subjects at one time).

(28) Higher Certificate (certificates to include the required subjects).

II. MEDICAL LICENSING BODIES.

Royal Colleges of Physicians and Surgeons in Ireland:—

(29) Preliminary Examination (certificate to include all the required subjects at one time).

III. EDUCATIONAL BODIES OTHER THAN UNIVERSITIES.

College of Preceptors:—

(30) Examination for a First-Class Certificate or Second-Class Certificate of First or Second Division (to include all the required subjects at one time).

(31) Preliminary Examination for Medical Students (certificate to include all the required subjects at one time).

Scotch Education Department:—
(32) Examination for Lower Grade Leaving Certificate (to include all the required subjects at one time).
(33) Examinations for Higher Grade or Honours Leaving Certificate (to include the required subjects).

Educational Institute of Scotland:—
(34) Preliminary Medical Examination (certificate to include all the required subjects at one time).

Intermediate Educational Board of Ireland:—
(35) Junior or Middle Grade Examination (certificate to include all the required subjects at one time).
(36) Senior Grade Examination (certificates to include the required subjects).

IV. INDIAN, COLONIAL, AND FOREIGN UNIVERSITIES AND COLLEGES.

Universities of Calcutta, Punjab, Allahabad, and Sydney:—
(37) Entrance Examination.

Universities of Bombay; Madras; M'Gill College and Bishop's College, Montreal; Fredericton, New Brunswick; Toronto; Trinity and Victoria, Toronto; Queen's, Kingston; Western, Ontario; Mount Allison College, New Brunswick; King's College, Nova Scotia; Dalhousie, Halifax; Melbourne; Sydney; and Cape of Good Hope; and the Colleges of Quebec; Trinity, Toronto; Ontario; and New Brunswick:—
(38) Matriculation Examination.

Ceylon Medical College; Universities of Manitoba, Otago, and New Zealand; and the Medical Boards of Nova Scotia and Newfoundland:—
(39) Preliminary Examination.

Universities of Madras and Sydney:—
(40) First Examination in Arts.

Universities of Sydney, Adelaide, and Tasmania:—
(41) Senior Public Examination.

Codrington College, Barbadoes:—
(42) Arts Examinations at Durham University.

Continental Bodies:—
(43) The German Abiturienten-Examen of the Gymnasia and Realgymnasia; Examinations entitling to the French Diplomas of Bachelier ès Lettres and Bachelier ès Sciences, and other corresponding Entrance Examinations to the Universities.

Egyptian Government:—
(44) Secondary Education Certificate.

(*a*) No certificate from the bodies in the foregoing section (IV.) is accepted unless it shows that the examination has been conducted by or under the authority of the body granting it, includes all the subjects required by the General Medical Council, and states that all the subjects of examination have been passed in at one time; and copies of the form of the required certificate are supplied by the registrar of the Council for the purpose.

(*b*) In the case of natives of India or other Oriental countries whose vernacular is other than English, an examination in a classic Oriental language may be accepted instead of an examination in Latin.

The Subjects in which Courses are required of all Candidates by the General Medical Council.

In every course of professional study and examinations, the following subjects must be contained:—

(1) Physics, including the elementary mechanics of solids and fluids, and the rudiments of heat, light, and electricity.
(2) Chemistry, including the principles of the science, and the details which bear on the study of medicine.
(3) Elementary biology.
(4) Anatomy.
(5) Physiology.
(6) Materia medica and pharmacy.
(7) Pathology.
(8) Therapeutics.
(9) Medicine, including medical anatomy and clinical medicine.
(10) Surgery, including surgical anatomy and clinical surgery.
(11) Midwifery, including diseases peculiar to women and to newborn children.
(12) Theory and practice of vaccination.
(13) Forensic medicine.
(14) Hygiene.
(15) Mental disease.

It is to be understood, as regards the above-mentioned subjects, that the Council offers no opinion as to the manner in which the subjects should be combined or distributed for purposes of teaching or examination.

TABLE III.—*Details of the Curriculum required by the various*

(Minimum Age in all, 21 years;

	SUBJECTS OF COURSES REQUIRED.																		
	Length of Compulsory Study at Institution giving Degree.	Chemistry.	Practical Chemistry.	Botany.	Zoology.	Physics.	Practical Physics.	Anatomy.	Practical Anatomy.	Physiology.	Practical Physiology.	Practical Histology.	Materia Medica and Therapeutics.	Practical Pharmacy.	Pathology.	Practical Pathology.	Post-mortems.
SCOTLAND.	Years																
M.B., Ch.B. Universities of Edinburgh, Glasgow, Aberdeen, St. Andrews	2	6	3	3	3	3	..	6	12	6	3	..	6	25 mtgs. or 3 mths.	6	3	3 mths. 20 [illegible] 25 [illegible] [illegible]
L.R.C.P. and L.R.C.S.Ed.; and L.F.P.S.Glasg.; and the Scotch Colleges . .	..	6	3	..	3	3	..	6	12	6	..	..	3	3	3	..	3
ENGLAND.																	
London University, M.B. " " B.S.	..	C.	C.	..	C.	C.	..	6	12	6	..	..	C.	C.	C.	..	C.
Durham University, M.B. " " B.S.	1	6	3	..	3	3	3	12	12	6	3	3	3	3	3	..	2[illegible] (sect.)
Victoria University, M.B. " " B.S.	2	6	3	..	4	6	3	6	15	6	C.	..	9	C.	6	C.	12
Universities of Oxford[1] M.B., Cambridge B.C.	6 3	C.	C.	..	C.	Course		C.	6	6	..	..	C.	C.	C.	..	C.
L.R.C.P.Lond.; and M.R.C.S.Eng., London Colleges .	..	C.	C.	..	C.	6	..	6	12	C.	6		3	3	3		12
L.S.A. London, Society of Apothecaries . . .	..	6	3	..	3	..	..	6	12	6	3	..	6	3	3	..	C.
IRELAND.																	
Dublin University, B.A. M.B., B.Ch., B.A.O. . . .	4	6	3	3	3	C.	..	6	12	12	..	3	3	..	6	3	..
Royal University, Dublin, M.B., B.Ch., B.A.O. . .	..	6	3	3	3	3		12	12	12	3	..	3	3	3	3	6 (sect[illegible]
L.R.C.P.I. and L.R.C.S.I., Irish Colleges . . .	..	6	3	..	3	3	..	6	12	6	..	3	3	3 or 3 yrs. apprentice.	..	..	3 mtgs.

Figures represent months unless

[1] The Oxford degrees are only conferred on those holding the B.A. degree of the University; the details of the

Universities and Licensing Bodies for Degrees or Diplomas.

ngth of Course, 5 years.)

WITH LENGTH OF ATTENDANCE.

Medical Jurisprudence and Public Health.		Medicine.	Clinical Medicine.	Surgery.	Clinical Surgery.	Operative Surgery.	Regional Anatomy.	Midwifery and Diseases of Women.	Diseases of Women.	Labour Cases, or Practical Midwifery.	Hospital Practice.	Dispensary.	Mental Diseases.	Infectious diseases.	Ophthalmology.	Diseases of Children, or Laryngology.	Clerk and Dresser in Hospital.		Vaccination.
											Years		Meetings.				Med.	Surg.	
3		6	9	6	9	C.	..	6	..	12 cases or 3 mths. and 6 cases	3	6	16 16 C. C.	12 10 3 mths. C.	24 20 3 mths. C.	18 (optional) 3 mths.	6	6	Certificate.
3		6	0	6	9	..	..	3	..	20 cases or 3 mths. and 6 cases	2	6	13	13	13	..	Certificate.		
													Mths.	Months.	Months.				
Course.		6	24	6	24	.. C.	.. ..	C.	..	20 cases	4	6	2	2	..	..	..	..	
3	C.	12	18	12	18	.. C.	.. C.	3	..	20 "	4	..	3	20 cases	..	..	6	6	
3	3	12	24	6	24	.. 6	.. ..	6	3	20 "	2	..	C.	C.	..	..	6	6	
.	C.	6	C.	6	C.	C.	..	C.	..	20 "	3	..	C.	3	..	..	6	6	
3	3	6	9	6	9	C.	..	3	12 mtgs.	20 "	2	6	C.	C.	3	..	6	6	
3	3	6	9	6	9	3	..	6	..	20 "	3	..	3	3	3		6	6	
											Mths.								
3	..	6	27	6	27	3	6	6	..	6 mths. 30 cases	27	..	3	C.	3	..	..	..	1
3	3	6	33	6	33	24 mtgs.	..	6	..	6 mths. 20 cases	33	..	3	10 cases and 3 mths.	3	..	3	3	10 mtgs.
3	..	6	27	6	27	30 mtgs.	..	6	..	6 mths. 30 cases	27	..	3	C.	3		..	..	Certificate.

otherwise stated. C. = Course.

curriculum required differ in many respects from the others, and may be obtained from the University Authorities.

TABLE IV.—*Table of Universities, Medical Schools and Institutions, with the Dates for Preliminary Examinations and Sessions,* 1899–1900.

		PRELIMINARY OR MATRICULATION EXAMINATION.	SESSIONS.		
			Winter.	Spring.	Summer.
ENGLAND AND WALES.					
London University		Jan. 9. | June 12.	..	..	..
The Royal College of Physicians, London; and Surgeons, England		Sept. | Dec. (Coll. of Preceptors.) March | June	..	..	..
London Hospitals	Guy's	As in last two.	Oct. 2.	..	May 2.
	St. Bartholomew's		" 2.	..	" 1.
	St. Mary's		" 2.	..	" 1.
	Westminster		" 2.	..	" 1.
	London		" 2.	..	" 2.
	Middlesex		" 2.	..	" 2.
	St. George's		" 2.	..	..
	Charing Cross		" 2.	..	" 1.
	St. Thomas's		" 3.	..	" 1.
	King's		" 2.	..	..
	University		" 2.	..	..
PROVINCIAL.					
Durham University		Sept. 13, Jan. 3, March 14.	" 2.	..	" 1.
Victoria University	University College, Liverpool	June and September.	" 3.	..	" 1.
	Owens College, Manchester		" 2.	..	" 1.
	Yorkshire College, Leeds		" 2.	..	" 1.
Mason University College, Birmingham		March and September.	" 2.	..	" 1.
University College, Bristol		June and September.	..	..	" 1.
Sheffield School of Medicine		" "	" 2.	..	..
Universities of Wales	University College, Bangor	Local Examinations by College of Preceptors, etc.	" 2.	..	..
	" " Cardiff		" 2.	..	..
	" " Aberystwyth	..	..	..	..
SCOTLAND.					
Universities of	Edinburgh	Oct. 1-8. | April 1-8.	Oct. 17.	..	April 25.
	Glasgow		" 5.	..	..
	Aberdeen		" 16.	..	..
	St. Andrews		" 11.	..	..
Edinburgh School of Medicine		Sept. 29, April 6, July 6.	" 17.	..	May 1.
University College, Dundee		..	" 12.	..	April.
St. Mungo's College, Glasgow		Sept. 29, April 6, July 6.	" 19.	..	"
Anderson's College, Glasgow			" 19.	..	"
IRELAND.					
Dublin University		(B.A. Degree.)	" 2.	..	May 1.
Royal University of Ireland		Sept. 27. | June.	..	..	..
Conjoint Colleges		" | March.	" 2.	..	April 1.
Catholic University		" | "	Nov. 2.	..	..
Queen's Colleges	Galway	Oct. 21, Nov. 11 | ..	Oct. 24.	..	May 1.
	Cork	" 18	" 23.	..	" 10.
	Belfast	" 21.			" 1.

C. SINGLE QUALIFICATIONS NOT CONFERRING IN THEMSELVES THE RIGHT TO REGISTER.

Many of the colleges confer degrees or diplomas on members of the profession who already possess a registrable qualification. The M.B. of London and Durham Universities allows the holder to practise, while the examination for M.B. at Oxford and Cambridge is the same as that for B.C.

Owing to the limited space at our disposal, it is impossible to enter into any details as to the conditions under which these degrees and diplomas are given, especially as they appertain to graduates who hardly require information about them. All the universities confer degrees of Doctor of Medicine and Master in Surgery on their graduates, only imposing as a condition that a longer or shorter interval shall elapse between graduation and the grant of the higher degree. Generally, the candidate has to present an original essay or thesis, and in some instances to pass a clinical examination.

At Cambridge University the M.D. degree may be taken three years after M.B., B.C. two years after M.C. The London and Durham M.D. and M.S. are conferred on M.B. and B.S. graduates respectively, after two years have elapsed; the equivalent degrees of the Victoria University, after one year. At the Scotch Universities the degrees of M.D. or Ch.M. are granted after two years' practice or one year's hospital or research work, if the candidate be 24 years old. Both the Irish Universities require three years to elapse.

Royal Colleges.

The Royal College of Physicians of London grants the membership to university graduates or to its licentiates after an examination, fee £42. Recipients must have attained the age of 25 years. The Royal College of Surgeons of England grants its fellowships to persons of or above 25 years of age, who have been five years in practice, and who must pass the membership examination before the second examination for the higher degree. Fee, if a member, £15, 15s.; if not, £31, 10s. Similarly, the Scottish corporations grant single licences to persons of either sex who already hold a recognised qualification—the Royal College of Physicians, Edinburgh, to those with a surgical; the Royal College of Surgeons, Edinburgh, and the Faculty in Glasgow, to those with a medical qualification. The fee in each case is £15, 15s.

The Royal College of Physicians, Edinburgh, confers its membership on licentiates of the college, and graduates of universities of the United Kingdom, after attaining 24 years, on examination. Fee for licentiate, £15, 15s.; for others, £31, 10s. The fellowship is conferred by election on members, aged 25, of two years' standing. Fee, £56, 10s.

An examination is required of candidates for the Fellowship of the Royal College of Surgeons, who must be 25 years of age, and registered practitioners of two years' standing. Fee for licentiates, £30; for others, £45. Similar regulations apply to the Fellowship of the Faculty of Physicians and Surgeons of Glasgow, but 24 is the minimum age. The fees are different, if the candidate desires to qualify for holding office or not; £50 or £30 for non-licentiates, £15 or £25 for licentiates.

The Royal College of Physicians of Ireland grants licences in medicine and in midwifery to registered practitioners, a membership diploma to licentiates 25 years of age, of three years' standing, and to practitioners of seven years' standing or University B.A.s., after one year's possession of the licence. Fee, £21 (£15, 15s. to graduates in Arts).

The Royal College of Surgeons in Ireland retains the right of deciding whether candidates for the Fellowship shall be admitted to examination or not. Licentiates or graduates in surgery of less than ten years' standing have to pass two examinations; fees, £26, 5s. for licentiates of the college, £42 for others. When of more than two years' standing they have only one examination; fees, £26, 5s. and £42, as before.

Further information with regard to these qualifications can be obtained from the secretaries of the different colleges. A list containing their names and addresses will be found below (p. xxii.).

Post-Graduate Courses.

In London, Edinburgh, Dublin, Cambridge, regular post-graduate classes are now held, although, when compared with the classes for graduates carried on in connection with many of the continental medical schools, they still leave much to be desired, both in arrangement and in the zeal shown by those who might be expected to support them more warmly. At most of the infirmaries and hospitals throughout the kingdom, in which clinical teaching is recognised, graduates can attend either on the same terms as undergraduates or at special rates.

In London practical courses are given throughout the year, exclusively for graduates, particulars of which can be obtained from Dr. Fletcher Little, 32 Harley Street, W. At present the lectures are delivered in connection with the following hospitals and institutions:—The Hospital for Diseases of the Skin, Blackfriars; Bethlem Royal Hospital for Lunatics; the London Throat Hospital, Great Portland Street; the Bacteriological Laboratory, King's College; the Central London Sick Asylum, Cleveland Street; the Parkes Museum; and the Institute of Preventive Medicine, 101 Great Russell Street, W.C.

At Charing Cross Hospital special series of clinical lectures and practical demonstrations, exclusively arranged for the convenience of practitioners and post-graduate students, are given by members of the staff throughout the year. The lectures for the year are arranged in three courses, each consisting of ten meetings, and lasting ten weeks.

In Cambridge, graduates of other universities are admitted as advanced students. They may for one or more terms pursue courses of advanced study or research, literary or scientific, under the direction of the University teachers, and may become members of certain colleges without fulfilling the same conditions as are imposed on junior students, their collegiate status being assimilated to that of students who have taken their first degree in the university.

In Edinburgh a number of classes open to post-graduates are carried on throughout the whole year:—Ophthalmology and Ophthalmoscopy; Laryngology and Diseases of the Throat, Nose, and Ear; Dermatology; Diseases of Children; Chest Diseases; and Gynæcology. A series of demonstrations of Modern Gastric Methods of Analysis and Treatment is available at any time on the request of a sufficient number of post-graduates desiring the course; while arrangements are from time to time made whereby these various classes may be attended as far as is possible and according to demand concurrently. On such occasions special courses in advanced surgical anatomy, medical anatomy, electrical methods, sanitary practice, and other specialties are included.

Any graduate desirous of ascertaining the details of the various classes should apply to the Honorary Secretary, Post-Graduate Courses, Surgeon's Hall, Edinburgh, when a full syllabus will be forwarded, or information supplied.

THE MEDICAL EDUCATION OF WOMEN.

A number of qualifications are now open to men and women alike. The degrees of the London and Durham Universities in England, of the Royal University of Ireland, and of the four Scotch Universities, may be conferred on women; who also may be granted the conjoint diplomas of the Scotch and Irish Boards, and the licence of the Society of Apothecaries, London.

The conditions for the qualification of women are practically the same as those for men. The University of Edinburgh, however, does not recognise attendance on mixed classes without sufficient reason shown.

The secretaries of the different schools, from whom prospectuses and any information required may be obtained, are as follows:—

London School of Medicine for Women—Miss Douie, 30 Handel Street, Brunswick Square, W.C.
Newcastle School of Medicine (Durham University)—Secretary, Durham University.
Medical College for Women, Minto House, Edinburgh—Miss H. F. Mackay.
Queen Margaret's College, Glasgow—Miss Galloway.

Royal College of Surgeons, Ireland (rooms in connection with the college are set apart for the use of female students)—L. F. Blake, Registrar.

The tables given below show the different degrees and diplomas open to women, the recognised schools, and the approximate cost of the class and college fees.

TABLE V.—*Degrees and Diplomas open to Women.*

University Degrees.	Diplomas.
London. Durham. The Royal, Ireland. The Four Scotch Universities.	1. *Conferring Qualification to Practise.* The Triple Qualification of the Royal Colleges, Scotland. The Conjoint Qualification of the Royal Colleges, Ireland. The Society of Apothecaries, London. 2. *Not conferring Qualification.* Licence of the Royal College of Surgeons, Edinburgh.

With the exception of two of the Scottish Universities, all these qualifications are given on the same conditions as to men. At Edinburgh and Glasgow Universities the compulsory two years' residence is allowed to be represented by residence at a recognised School for the Medical Teaching of Women.

TABLE VI.—*Medical Schools for Women.*

Name.	Cost of Curriculum and Fees.
London School of Medicine for Women, Brunswick Square	£125
College of Medicine, Newcastle-on-Tyne .	£146
Scottish Association, Edinburgh (qualifies for Edinburgh University)	(University), £128, 7s. (Colleges), £130
Queen Margaret College, Glasgow (qualifies for Glasgow University)	£129
Schools of Surgery of the Royal College of Surgeons, Ireland	(For College Degree), £165–£172.
Aberdeen and St. Andrews Universities (only first two years at St. Andrews).	
Dundee University College (only for first two years).	

PUBLIC HEALTH.

The Local Government Act, passed in 1888, provides that all medical officers of health of counties or districts with a population of 50,000 or more, must possess a diploma in public health, or must have been a medical officer of a district with 20,000 inhabitants for three consecutive years before 1892; or, before the passing of the aforesaid Act, have been for not less than three years a medical officer or inspector under the Local Government Board.

Qualifications in public health (sanitary science, sanitary medicine, State medicine) are therefore much more sought after than formerly. They do not carry a right to register, and are only conferred on candidates already possessed of a registrable qualification.

Certain regulations for candidates for diplomas in public health, designed to ensure "the possession of a distinctly high proficiency, scientific and practical, in all the branches of study which concern the public health," have been laid down by the General Medical Council. The Council now expects the following rules to be observed:—

Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended during six months, practical instruction in a laboratory.

1. A period of not less than twelve months shall elapse between the attainment of a registrable qualification in medicine, surgery, and midwifery, and the admission of the candidate to any examination or any part thereof for a diploma in sanitary science, public health, or State medicine.

2. Every candidate shall produce evidence of having, after obtaining a registrable qualification, attended during six months, practical instruction in a laboratory or laboratories, British or foreign, approved of by the body granting the diploma, in which chemistry, bacteriology, and the pathology of the diseases of animals transmissible to man are taught.

3. Every candidate shall produce evidence that, during a period of six months after obtaining a registrable qualification, he has practically studied the duties of outdoor sanitary work—(*a*) In England and Wales, either under the medical officer of health of a county or of a single sanitary district having, at the date of the last census, a population of not less than 50,000, or the medical officer of health of a combination of two or more sanitary districts having collectively at the date of the last census a population of not less than 35,000; or (*b*) in Scotland or Ireland, under the medical officer of health of a county, or of one or more sanitary districts having at the date of the last census a population of not less than 30,000; or (*c*) under a medical officer of health who is a teacher in the department of public health of a recognised medical school. The certificate of an assistant officer of health of a county or a large urban district may be accepted, provided the medical officer of health of the county or district consents to the assistant officer giving such instruction.

⁂ Any candidate who shall produce evidence that he has himself held an appointment of medical officer of health, under conditions not requiring the possession of a special sanitary diploma, shall be exempt from this regulation.

4. Every candidate shall produce evidence that he has attended

the clinical practice of a hospital for infectious diseases, recognised by one of the licensing bodies; provided that such a course of instruction may have been taken as part of the curriculum for his registrable qualification in medicine, surgery, and midwifery.

5. The examination shall be conducted by examiners specially qualified; it must extend over not less than four days, one of which shall have been devoted to practical work in a laboratory, and one to practical examination in, and reporting on, subjects which fall within the special outdoor duties of a medical officer of health.

⁂ The rules as to study shall not apply to medical practitioners registered, or entitled to be registered, on or before 1st January 1890.

Degrees and Diplomas.

DEGREES (FOR UNIVERSITY GRADUATES IN MEDICINE).

M.D. (State Medicine), London. (Two years' study required.)

B.Hy., Durham. (Three months' course in comparative pathology (lectures), must study at Newcastle School of Medicine.)

B.Sc., Edinburgh. (Eight months' laboratory (five at Edinburgh University), courses in physics, geology, public health, sanitary engineering, and in mensuration and drawing required, as well as official regulations.)

D.Hy., Durham. (Earliest date, two years after B.Hy., spent as M.O.H. Essay sent in.)

D.Sc., Edinburgh. (Five years after B.Sc., Thesis and Examination.)

DIPLOMAS.

D.P.H.
Durham University. (Regulations as for B.Hy., but need not be a University graduate, nor have studied at Newcastle.)
Oxford University. (Must fulfil General Medical Council's conditions.)
Cambridge University. (Do., age 24 or over.)
Victoria University. (As at Oxford.)
Aberdeen University. (Fever hospital course, six months; if not M.B. Aberd., must attend some of the necessary classes.)
Royal Colleges, London. (As at Cambridge.)
Royal Colleges, Edinburgh and Glasgow. (As at Oxford.)

D.S.M., Dublin University. (Must be a graduate of the Universities of Dublin, Oxford, or Cambridge, or M.D.)
,, Royal Colleges, Ireland. (As at Oxford.)
D.S.Sc., Royal University, Ireland. (Only conferred on graduates of the University. Cf. p. 167 of Calendar.)

Medical practitioners who registered or were entitled to register before 1st January 1890 are admitted to the examination for the Durham D.P.H., under the same conditions as are noted above. Twenty-eight days' notice is required. Fee, £10, 10s. At Oxford and Cambridge Universities the diplomas in public health are granted to any registered person who, if he qualified before 1st January 1890, is not required to pursue a prescribed course of study. Similar regulations govern the examinations of the different colleges in the case of those who qualified prior to 1890.

The actual scope of the examinations as held at the different centres can be easily ascertained from the syllabuses and calendars to be obtained from the secretaries. The titles of the books best adapted for perusal in view of the examinations may be seen in the *British Medical Journal* for 26th August 1899.

Age necessary. London, M.D. (State Med.), 23 years; Cambridge and London Colleges, 24 years; others, 22 years.

Fees for examinations—£10, 10s.; Colleges in London, Scotland, and Ireland, D.P.H., Durham and Victoria, £5, 5s.; Aberdeen, £5; London University and Royal Ireland, £6, 6s.; Edinburgh, £12, 12s.; Cambridge, £16, 10s. B.Hy., Durham, D.Sc., Edinburgh, £10, 10s. additional.

Usual fee for six months' laboratory work, £10, 10s. to £21.

Institutions at which Laboratory Work and Classes for Public Health Curriculum can be taken.

LONDON.

St. Bartholomew's Hospital.—Inclusive fee, 20 guineas.

Charing Cross Hospital.—Inclusive fee, 20 guineas.

St. George's Hospital.—Inclusive fee, 20 guineas; for candidates registered before 1st January 1890, 12 guineas.

Guy's Hospital.—Inclusive fee for six months' course of laboratory instruction and lectures, 20 guineas.

King's College.

London Hospital.—Inclusive fee, 20 guineas; three months' course, 12 guineas.

St. Mary's Hospital.—Six months' course, inclusive fee, 12 guineas.

St. Thomas's Hospital.—Inclusive fee, 20 guineas; short course, 6 guineas.

University College.

PROVINCIAL.

Cambridge University.

Mason University College, Birmingham.

University College, Liverpool.

Yorkshire College, Leeds.

University of Durham College of Medicine, Newcastle-on-Tyne.

University College, Bristol.

IRELAND.

School of Physic, Dublin.

The Catholic University School of Medicine.

Royal College of Surgeons, Schools of Surgery, Dublin.

SCOTLAND.

University of Edinburgh.—Fees, winter session, 10 guineas; summer session, 6 guineas.

University of Glasgow.—Fee for course of instruction, 10 guineas.

University of Aberdeen.

St. Mungo's College, Glasgow.—Fees: winter session of lectures and six months' laboratory instruction, 12 guineas; summer session of lectures and three months' laboratory instruction, 6 guineas.

The Conjoint Board in Scotland.

CLINICAL HOSPITALS.

There are a number of hospitals throughout the kingdom which may be attended for the purpose of clinical study, especially during the fifth year of the curriculum, and attendance at which is accepted by many of the licensing boards as part of the compulsory period for hospital work.

In *London*, in addition to the clinical hospitals attached to the medical schools, the conjoint board of the Royal Colleges of Physicians and Surgeons accept certificates of attendance during the fifth year of study, from the—Great Northern Central Hospital, 155 beds; West London Hospital, 175 beds, Fee, 5 guineas; The Hospital for Sick Children, Great Ormond Street, 186 beds, Fee, 3 guineas; East London Hospital for Children, 100 beds, Fee, 4 guineas; Royal London Ophthalmic Hospital, 100 beds, Fee, 5 guineas; Hospital for Consumption, Brompton, 321 beds, Fee, 8 guineas; City of London Hospital for Diseases of the Chest, 164 beds; National Hospital for the Paralysed, etc., Queen Square, 200 beds; Queen Charlotte's Lying-in Hospital, 1100 patients annually, Fee, 8 guineas for four weeks.

Fever hospitals and asylums.—The Metropolitan Fever Hospitals, Fee, £3, 3s., two months, £1, 1s. each additional month; Bethlem Royal Hospital, Lower Hall Asylum, Bow; Camberwell House Asylum, Bethnal.

THE PROVINCES.

Liverpool—Royal Southern, 200 beds, Fee, £26, 5s.[1]; Northern, 155 beds, Fee, £26, 5s.[1]; Eye and Ear Infirmary, Myrtle Street, 46 beds; Infirmary for Children, 88 beds, free.

Manchester—St. Mary's Hospital for Diseases of Women and Children, 55 beds 3400 labours, Fee for necessary course, £2, 2s.

Newcastle-on-Tyne—Hospital for Sick Children, 60 beds, free.

Bath—Royal United Hospital, 130 beds.

Birmingham—Midland Hospital for Skin and Urinary Diseases, £5, 5s. for three months.

Bradford—Royal Infirmary, 230 beds, £10, 10s.[1]

Brighton—Sussex County Hospital, 190 beds, £21 for two years.

Derby—Derbyshire Royal Infirmary, 198 beds, £10, 10s. annually.

Devonport—Royal Albert Hospital, 88 beds, £2, 2s.

Hospitals in *Exeter*, *Gloucester*, £20 a year; *Lincoln*, £10, 10s.; *Norwich*, £15, 15s.; *Nottingham*, £10, 10s.; *Staffordshire*, £10, 10s.; *Winchester*, £21;[1] *Wolverhampton*, £21.[1]

SCOTLAND.

Edinburgh—Royal Infirmary, 790 beds, £12[1]; Victoria Hospital for Consumption, £2, 2s. for course; Royal Hospital for Sick Children, 96 beds, £2, 2s. for course; Eye, Ear, and Throat Infirmary, £1, 1s.; Royal Maternity, £2, 2s.; City Hospital for Infectious Diseases, £2, 2s.; Royal Asylum, Morningside, 700 beds, £2, 2s.

Glasgow—Royal Hospital for Sick Children, 80 beds, £1, 1s.; Western Infirmary, 400 beds, £21[1]; Eye Infirmary, £1, 1s.; Royal Infirmary, £21[1]; Maternity; Belvidere Fever Hospital; Lock Hospital.

Dundee—Royal Infirmary, 286 beds; Royal Asylum.

Aberdeen—Royal Infirmary, Fee, £6; Sick Children's Hospital.

IRELAND.

Dublin—Sir Patrick Dun's Hospital, £12, 12s;[1] Richmond, Whitworth, and Hardwicke Hospitals,[2] 312 beds; Richmond Asylum, 1200 beds; Adelaide Hospitals, 140 beds; City of Dublin Hospital; Jervis Street Hospital, £12, 12s. a year; Mater Misericordiæ Hospital,[2] 323 beds; Dr. Steeven's Hospital,[2] 200 beds, £10, 10s., three months; St. Vincent's Hospital, 160 beds; Meath Hospital,[2] 160 beds; Rotunda Hospital, 1700 labours intern, 1800 extern annually—Fee, for term, six months, £21, three months, £12, 12s., Extras, £10, 10s. and £6, 6s.; Cork Street Fever Hospital; Coombe Lying-in Hospital.

Belfast—The Royal, £20;[1] Maternity; Ophthalmic; Eye, Ear, and Throat Hospitals; and those for Diseases of Women, for Sick Children, and the District Asylum.

Cork—North (100 beds) and South (100 beds) Infirmaries; the Mercy, Cork Union, Lying-in, Maternity, Fever, Gynecological, and Ophthalmic and Aural Hospitals; and the Eglinton Asylum.

Galway—County Infirmary and Lower Hospital.

DENTAL SURGERY.

Licences to practise dentistry and to be registered are obtainable from the Royal College of Surgeons of England, of Edinburgh, and of Ireland, and from the Faculty of Physicians and Surgeons of Glasgow.

A large number of the medical teaching institutions provide special arrangements for dental students. A list of the majority of these is given on page xxii.

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[1] Perpetual.

[2] Contain beds for Fever patients.

REGULATIONS OF THE GENERAL MEDICAL COUNCIL.

Candidates for a diploma in dental surgery shall produce certificates of having been engaged during four years in professional studies, and of having received three years' instruction in mechanical dentistry from a registered practitioner. One year's *boná fide* apprenticeship with a registered dental practitioner, after being registered as a dental student, may be counted one of the four years of professional study. The three years of instruction in mechanical dentistry, or any part of them, may be taken by the dental student, either before or after his registration as a student; but no year of such mechanical instruction shall be counted as one of the four years of professional study unless taken after registration.

A register of dental students is kept by the Registrar of the General Medical Council, 299 Oxford Street, London.

Preliminary education.—Dental students are subject to the same regulations as regards preliminary education as medical students, but professional study may commence by pupilage with a registered dental practitioner.

THE ROYAL COLLEGE OF SURGEONS OF ENGLAND.

Licence in Dental Surgery.

The following are the regulations:—

I. There is a Preliminary Science Examination and two Professional Examinations for the licence. The Preliminary Science Examination consists of chemistry, physics, and practical chemistry, and is identical with Part I. of the First Examination of the Examining Board in England. The First Professional Examination for the licence consists of mechanical dentistry and dental metallurgy; and the Second, general anatomy and physiology, general surgery and pathology, dental anatomy and physiology, dental pathology and surgery, and practical dental surgery. Candidates will be required to show a general knowledge of the anatomy of the whole human body.

II. Candidates will be required to produce certificates of having received instruction, at an institution recognised for the purpose, in chemistry, physics, and practical chemistry, before entering for the Preliminary Science Examination.

⁂ This instruction may be taken prior to the date of registration as a dental student.

III. Candidates will be required to produce the following certificates before entering for the First Professional Examination, namely:—

1. Of having been engaged, during a period of not less than three years, in acquiring a practical familiarity with the details of mechanical dentistry, under the instruction of a competent practitioner, or under the direction of the superintendent of the mechanical department of a recognised dental hospital, where the arrangements for teaching mechanical dentistry are satisfactory to the Board of Examiners in Dental Surgery. In the case of qualified surgeons, evidence of a period of not less than two instead of three years of such instruction will be sufficient.

⁂ This instruction may be taken prior to the date of registration as a dental student.

2. Of registration as a dental student by the General Medical Council.

3. Of having attended at a recognised dental hospital and school:

(*a*) A course of lectures on dental metallurgy.

(*b*) A course of practical dental metallurgy.

(*c*) A course of lectures on dental mechanics.

(*d*) A course of practical dental mechanics, including the manufacture and adjustment of six dentures and six crowns.

IV. Candidates will be required to produce the following certificates before entering for the Second Professional Examination, namely:—

1. Of having been engaged during four years in the acquirement of professional knowledge, subsequently to the date of registration as a dental student.

2. Of having attended at a recognised dental hospital and school:

(*a*) A course of dental anatomy and physiology.

(*b*) A separate course of dental histology, including the preparation of microscopical sections.

(*c*) A course of dental surgery.

(*d*) A separate course of practical dental surgery.

(*e*) A course of not less than five lectures on the surgery of the mouth.*

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* These lectures may be given either at a recognised dental hospital and school, in which case the lecturer must be a qualified surgeon practising surgery, or they may be given at a recognised medical school, and may form part of the course required by Section IV., Clause 4 (*d*).

3. Of having attended at a recognised dental hospital or in the dental department of a recognised general hospital, the practice of dental surgery during two years.

4. Of having attended at a recognised medical school:

(*a*) A course of lectures on anatomy.

(*b*) A course of lectures on physiology.

(*c*) A separate practical course of physiology.

(*d*) A course of lectures on surgery.

(*e*) A course of lectures on medicine.

5. Of having performed dissections at a recognised medical school during not less than twelve months.

6. Of having attended at a recognised hospital or hospitals, the practice of surgery and clinical lectures on surgery during two winter sessions.

7. Of being 21 years of age.

⁂ The certificates of professional study will be required to show that students have attended the courses of professional study to the satisfaction of their teachers.

V. Candidates may present themselves for the Preliminary Science Examination before entering at a dental school, on production of the certificates required under Section II. This examination will be identical with Part I. of the First Examination of the Examining Board in England.

VI. Candidates may present themselves for the First Professional Examination for the licence after the completion of six months' attendance at a recognised dental hospital and school, on production of the certificates required under Section III.

VII. Candidates may present themselves for the Second Professional Examination, on production of the certificates required under Section IV., after the completion of four years' professional study from the date of registration as a dental student, and after the lapse of not less than six months from the date of passing the First Professional Examination.

VIII. Synopses of the examination in chemistry, physics, and practical chemistry, and dental metallurgy, are issued with the regulations.

IX. The Preliminary Science Examination will be held in January, March or April, July and October in each year.

The First and Second Professional Examinations will be held in May and November in each year. Candidates are required to give twenty-one clear days' notice of their intention to present themselves for examination.

Special Exemptions.

A candidate who shall produce satisfactory evidence of having passed an examination for a degree in medicine, conducted at a university in the United Kingdom, in India, or in a British colony, on the subjects of the Preliminary Science Examination, will be exempt from that examination.

Candidates who have passed the Second Examination of the Examining Board in England, or who shall produce evidence of having passed the examination in anatomy and physiology required for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in anatomy and physiology required for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in those subjects.

Candidates who are members of the college, or who have passed the examination in surgery of the Examining Board in England, or who shall produce evidence of having passed the examination in surgery for the licence in surgery of the Royal College of Surgeons of Edinburgh, the Royal College of Surgeons in Ireland, or the Faculty of Physicians and Surgeons of Glasgow, or an examination in surgery for a degree in medicine or surgery at a university in the United Kingdom, will be exempt from re-examination in general surgery and pathology.

Fees to be paid by candidates, £21.

THE ROYAL COLLEGE OF SURGEONS OF EDINBURGH.

Licence in Dental Surgery.

The candidate must fulfil the conditions of the regulations of the General Medical Council (see above); and the regulations as to curriculum are generally the same as those of the Royal College of Surgeons of England.

Special Exceptions.

Candidates who have passed the corresponding examinations for the Triple Qualification will be exempt from the First Dental Examination, and will have the advantage of being admissible either to the Final Dental Examination or to the Final Examination for the Triple

Qualification, or to both. But the First Dental Examination will not be held as equivalent to the Triple Examinations, and will admit to the Final Dental Examination only. Candidates who are licentiates of this college, or who may be registered medical practitioners, will require to produce certificates of attendance on the special subjects only, and will be examined in these only for the dental diploma. Any candidates who shall produce satisfactory evidence of having passed in any of the subjects of the First Dental Examination, before any dental or surgical licensing board recognised by the Royal College of Surgeons of Edinburgh, will be exempt from examination in such subject or subjects; but no examination will be recognised as giving exemption, unless it is coextensive in its scope with the examinations of this college, and is the only final examination on the subject or subjects required by the board at which it was passed.

Fees.—The fee for the diploma is £10, 10s. to those who began their studies before 1st October 1896; £15, 15s. to those who began after that date.

Faculty of Physicians and Surgeons of Glasgow.

The regulations as to certificates, curriculum, number of examinations, fees, and examinations are in effect similar to those of the Royal College of Surgeons of Edinburgh. There is special provision for candidates who intend to qualify both under the Medical and Dentists Act, and there is an examination in practical dentistry conducted in a dental hospital, and also a practical examination in mechanical dentistry.

The Royal College of Surgeons in Ireland.

Licence in Dentistry.

Candidates are required to pass three examinations, namely, Preliminary (in general education), Primary Dental, and Final Dental.

DENTAL TEACHING INSTITUTIONS.

London.

Dental Hospital of London and School of Dental Surgery, Leicester Square. Fee for dental course of two years, £50. Fee for general and hospital practice for two years, £55.

National Dental Hospital or College, Great Portland Street, W. Fee for necessary course, £42.

Guy's Hospital and London Hospital.

Provinces.

Mason University College, Birmingham. Composition fee, £73, 2s.

Liverpool Dental Hospital (University College). Composition fee, £73, 2s.

Bristol General Hospital.

Durham University and Newcastle School of Medicine.

University College, Bristol.

Owens College, Manchester.

Devon and Exeter Dental Hospital, Exeter.

Scotland.

Incorporated Edinburgh Dental Hospital and School. Minimum fee, £78, 13s.

Dental Hospital and School, Glasgow.

Dental Department, Royal Glasgow Infirmary.

Anderson's College, Glasgow.

Ireland.

School of the Royal College of Surgeons, Ireland.

Special composition fees are charged at several of the London hospitals for the classes required by dental students apart from those taken at a dental hospital. Thus, Charing Cross and Middlesex Hospitals, £56, 14s.; Westminster Hospital, £50; St. Thomas's, £65; St. George's, £50; King's College, hospital fee, two years, £25, 4s.; lectures, £15, 15s.

NAMES AND ADDRESSES OF THE SECRETARIES AND REGISTRARS OF CERTAIN OF THE MEDICAL SCHOOLS.

I. *Branch Registrars of the General Medical Council.*

England—Mr. H. E. Allen, B.A., LL.B, 299 Oxford Street, London, W.

Scotland—Mr. James Robertson, 48 George Square, Edinburgh.

Ireland—Mr. S. Wesley Wilson, 35 Dawson Street, Dublin.

II. *Secretaries and Registrars, etc., of Medical Bodies.*

The Secretary—English Conjoint Board, Victoria Embankment, London, W.C.

The Secretary—Royal College of Surgeons, Lincoln's Inn Fields, London, W.C.

The Secretary—Apothecaries' Hall, Blackfriars, London, E.C.

The Secretary—University of Durham, College of Medicine, Newcastle-on-Tyne.

The Secretary—Royal College of Physicians, Edinburgh.

The Secretary—School of Medicine of the Royal Colleges, Edinburgh, 24 Forrest Road, Edinburgh.

The Secretary—Royal College of Surgeons, Edinburgh.

The Secretary—Anderson's College Medical School, Glasgow; Professor A. M. Buchanan, M.A., M.D.

The Secretary—Educational Institute of Scotland, 40 Princes Street, Edinburgh.

The Secretary—Royal University of Ireland, Dublin.

The Registrar—Royal College of Physicians, Pall Mall East, London, S.W.

The Registrar—University of London, Burlington Gardens, London, W.

The Registrar—Mason University College, Birmingham.

The Dean of the Faculty of Medicine—In each of the Scotch Universities.

The Dean of the Faculty of Medicine—Victoria University, Owens College, Manchester.

The Secretary—Irish Conjoint Board, 6 Kildare Street, Dublin.

III. *Inspectors of Conjoint Examination in Scotland.*

Mr. James Robertson, 48 George Square, Edinburgh.

Mr. Alexander Duncan, B.A., Faculty Hall, 242 St. Vincent Street, Glasgow.

ARMY MEDICAL DEPARTMENT.

WAR OFFICE, LONDON.

Schedule of Qualifications necessary for Candidates desirous of obtaining Commissions in the Army Medical Staff, with the Conditions of Service.

QUALIFICATIONS.

1. A candidate for a commission in the Army Medical Staff must be 21 years and not over 28 years of age at the date of commencement of the competitive examination. He will be required to produce the following documents:—

(*a*) An extract from the register of his birth; or, if this is not obtainable, a declaration made before a magistrate by one of his parents or guardians, giving the date of his birth.

(*b*) A recommendation from a person of standing in society (not a member of his own family) to the effect that he is of regular and steady habits, and likely in *every* respect to prove creditable to the department, if a commission be granted.

(*c*) A certificate of moral character from the clergyman of the parish in which the candidate resides, if possible.

2. He must possess two diplomas or licences, recognised by the General Medical Council,—one to practise medicine and the other surgery, and must be registered under the Medical Act in force in the United Kingdom at the time of his appointment; but a candidate who holds a single diploma from the Society of Apothecaries, obtained under the conditions of the Medical Act of 1886, will be deemed to possess the double qualification required.

A candidate must also produce:—

(*a*) A certificate of having discharged the duties of a medical clinical clerk during six months, and of a surgical dresser during another six months, of which, in each case, not less than three months must have been spent in the wards of a hospital.

(*b*) A certificate of having attended a course of instruction during not less than three months at an ophthalmic hospital, or the ophthalmic department of a general hospital, which course shall include instruction in the errors of refraction.

3. The candidate must sign a declaration upon honour that he is of pure European descent, and that he labours under no mental or constitutional disease, no hereditary or personal tendency thereto, nor any imperfection or disability that can interfere with

the efficient discharge of the duties of a medical officer in any climate; also that he does not hold, and has never held, any commission or appointment in the public services.

4. His physical fitness will be determined by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to pass the tests laid down by regulations. The board must also certify that he is free from organic or other disease, and from constitutional weakness, or other disability of any kind likely to unfit him for military service in any climate.

Certificates of age, registration of diplomas, etc., and of character, must accompany the declaration when signed and returned.

5. A public and open competition will be held twice in the year for the admission of qualified candidates as probationers. The number of appointments so competed for will be not less than half of the number of vacancies which shall have arisen in the last completed half-year ending on the 30th June or 31st December. It will be competent for the Secretary of State for War to fill up the remaining number from such qualified candidates as may be proposed by the governing bodies of public schools of medicine in the United Kingdom, or in the Colonies, as he may think proper. Every candidate so proposed must be approved by the Director-General of the Army Medical Department, and be certified by the governing body proposing him to be duly qualified, according to a standard laid down by the Secretary of State.

The Secretary of State reserves the right of rejecting any candidate who may show a deficiency in his general education, as evinced by bad spelling or composition.

An entrance fee of £1 is required from each candidate admitted to the competition, and is payable at the conclusion of his physical examination, if pronounced fit.

6. The Secretary of State for War will from time to time fix the order of precedence and the proportion in which the several schools of medicine shall be offered the nomination of candidates.

7. A surgeon on probation will be required to pass through such course at the Army Medical School as the Secretary of State shall decide, and after passing a qualifying examination in the military medical subjects taught there, and satisfying the Director-General that he possesses the necessary skill, knowledge, and character for permanent appointment to the Army Medical Staff, he will be commissioned as surgeon-lieutenant.

The surgeons on probation who pass out of the Army Medical School at one qualifying examination will take precedence among each other as surgeon-lieutenants, as follows:—(*a*) Those appointed on nomination, according to their date of joining on probation; (*b*) those appointed by competition, according to the last day of the competitive examination, and in order of merit, as determined by the combined results of the competitive and qualifying examinations, with priority over any joining under paragraph (*a*) on the last day of the competitive examination. Their commissions will bear the date of the day of their passing out of the Army Medical School.

EXAMINATIONS.

Compulsory Subjects for the Entrance Examination.

1. Candidates will be examined by the Examining Board in the following compulsory subjects, and the highest number of marks attainable will be distributed as follows:—(*a*) Surgery, 1200; (*b*) medicine, including therapeutics and diseases of women and children, 1200; (*c*) anatomy and physiology, 600; (*d*) chemistry and pharmacy, and a practical knowledge of drugs, 600. No candidate shall be considered eligible for the medical staff who shall not have obtained at least *one-third* of the marks obtainable in each of the above *compulsory subjects*, and at least *one-half* of the aggregate of marks for all the compulsory subjects.

Voluntary Subjects for the Entrance Examination.

2. Candidates may be examined in the following voluntary subjects, for which the maximum number of marks obtainable will be:—Modern languages—French, German, and Hindustani, 200 marks each. Natural sciences—A candidate may not present himself for examination in more than two of the following subjects:—(*a*) Physics, 300; (*b*) zoology, 300; (*c*) geology and physical geography, 300; (*d*) botany, 300. A number less than one-third of the marks obtainable in each of these *voluntary subjects* will not be allowed to count in favour of the candidate who has qualified in the *compulsory subjects*. The knowledge of modern languages being considered of great importance, all intending competitors are urged to qualify in French and German.

The appointments announced for competition will be filled up from the list of qualified candidates, arranged in the order of merit, as finally determined by the total number of marks each has obtained in both the compulsory and voluntary subjects.

After passing this examination, every successful candidate will be required to attend one course of practical instruction at the Army Medical School as a surgeon on probation in—(1) Hygiene; (2) clinical and military medicine; (3) clinical and military surgery; (4) pathology of diseases and injuries incident to military service.

All surgeons on probation will be required to conform to such rules of discipline as the senate may from time to time enact, and provide themselves with uniform, namely, the regulation undress and mess uniform of a surgeon-lieutenant, including the serge jacket, but without the sword, sword-belt, dress trousers, and badge of rank.

They will be required to attend the Army Medical Staff mess at Netley, and to conform to the rules and regulations thereof.

Extracts from the Royal Warrant for Pay and Promotion, 1894, *as amended by Royal Warrant of* 18*th Sept.* 1894, *and from the Regulations for Army Medical Services,* 1894.

PAY.

The pay of the officers of our Army Medical Staff shall be at the following rates:—

		Exclusive of Allowances.		
Director-general of the Army Medical Department, at headquarters .	(yearly)	£1500	0	0[1]
Surgeon-major-general	(daily)	2	15	0
At headquarters	(yearly)	1300	0	0[1]
Surgeon-colonel	(daily)	2	0	0
At headquarters	(yearly)	900	0	0[1]
Brigade-surgeon-lieutenant-colonel .	(daily)	1	10	0
After 5 years in the rank . .	„	1	13	0
At headquarters	(yearly)	750	0	0[1]
Surgeon-lieutenant-colonel:—				
After 20 years' service . .	(daily)	1	5	0
„ 25 „	„	1	7	6
At headquarters	(yearly)	650	0	0[1]
Surgeon-major or surgeon-lieutenant-colonel	(daily)	1	0	0
After 15 years' service . .	„	1	2	6
At headquarters	(yearly)	650	0	0[1]
Surgeon-captain or surgeon-lieutenant	„	200	0	0
Surgeon-captain	„	200	0	0
After 5 years' service . . .	„	250	0	0
„ 10 „	(daily)	0	15	0
Surgeon on probation	„	0	8	0

Quartermaster (daily) as a quartermaster of infantry (Arts. 187 and 191).

RETIRED PAY.

An officer of our Medical Staff, after completing ten years' service on full pay, may be permitted to retire from our army with retired pay or gratuity, according to the scale laid down in Art. 1071, if such voluntary retirement be specially recommended by our Commander-in-Chief, and approved by our Secretary of State.

The appointment of Director-General of the Army Medical Department shall be for seven years, and the retirement of the other officers of our Army Medical Staff shall be compulsory at the following ages, except that if it should in any particular case be considered desirable in the interests of the public service, the age for the retirement of a surgeon-major-general may be extended for a period not exceeding two years—surgeon-major-general and surgeon-colonel, 60 years; brigade-surgeon-lieutenant-colonel, surgeon-lieutenant-colonel, surgeon-major, surgeon-captain, and surgeon-lieutenant, 55 years.

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[1] Inclusive of allowances.

RATES.

Director-general, Army Medical Department:—	Yearly.		
After 7 years' service as director-general, and not less than 30 years' service in the department	£1125	0	0
After 5 years' service as director-general, and not less than 30 years' service in the department	1000	0	0
Under 5 years' service as director-general, if retiring on account of ill-health, and after not less than 30 years' service in the department	875	0	0
After 3 years' service as director-general, but with less than 30 years' service in the department, in addition to the retired pay of a surgeon-major-general	100	0	0
	Daily.		
Surgeon-major-general, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily	£2	0	0
Surgeon-colonel, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily	1	15	0
Brigade-surgeon-lieutenant-colonel, on retirement under Art. 347, 457, or 458, or with 3 years' service as such,[1] if retiring voluntarily:—			
Under 30 years' service	1	7	6
After 30 ,,	1	10	0
Surgeon-lieutenant-colonel:—			
After 20 years' service	1	0	0
,, 25 ,,	1	2	6
,, 30 ,,	1	5	0
Surgeon-major:—			
After 20 years' service	1	0	0
Surgeon-lieutenant-colonel, surgeon-major, surgeon-captain, or surgeon-lieutenant:—	Gratuity.		
After 10 years' service	£1250	0	0
,, 15 ,,	1800	0	0
,, 18 ,,	2500	0	0

An officer of our Army Medical Staff who, on voluntary retirement, has served for less than three years in the rank from which he retires, shall be only entitled to the gratuity or retired pay assigned to the next lower rank.[1]

PROMOTION.

A surgeon-lieutenant shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-captain on completing three years' full-pay service.

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[1] The requirement of three years' service in the rank only applies, in the case of the medical staff, to officers promoted since the date of the warrant of August 26, 1889.

A surgeon-captain shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-major on completing twelve years' full-pay service, including at least three years abroad.

A surgeon-major shall, if he be recommended by the Director-General, be promoted to the rank of surgeon-lieutenant-colonel, on completing twenty years' full-pay service.

A brigade-surgeon-lieutenant-colonel shall be selected, on the recommendation of our Commander-in-Chief, for ability and merit, from surgeon-lieutenant-colonels who have served abroad for at least eight years.

All promotions from the rank of brigade-surgeon-lieutenant-colonel to that of surgeon-colonel, and from the rank of surgeon-colonel to that of surgeon-major-general, shall be given for ability and merit, upon the selection of our Commander-in-Chief, with the approval of our Secretary of State; and the grounds of such selection shall be stated to us in writing. In all such cases the amount of service abroad shall be expressly stated.

On appointment as honorary physician or honorary surgeon to Her Majesty, under Article 345, an officer below the rank of surgeon-colonel shall, if duly qualified under Article 343, be promoted to that rank, and shall remain supernumerary of his rank until he would have attained the rank of surgeon-colonel in ordinary course.

An officer shall not be eligible for promotion to the rank of surgeon-colonel unless he has served at least ten years abroad, including three years in India.

Regulations for the Examination of Surgeon-Captains before Promotion to Surgeon-Major (Regulations for Army Medical Service, Appendix I.)

1. This examination is intended to test the progress and proficiency of a surgeon in all those branches of knowledge which are essential to his continued efficiency as a medical officer, and may be taken at any time after his seventh year of service.

The examination in medicine and surgery will be held by two gentlemen appointed by the Secretary of State; that in hygiene by the Professor of Hygiene, Army Medical School, Netley; and that in regulations, duties, military law, etc., by an administrative medical officer, nominated for the purpose by the Director-General.

2. The examination will embrace the following subjects:—(*a*) Surgery and surgical anatomy. (*b*) Medicine and pathology. (*c*) Hygiene, within the limits treated of in Parkes' "Practical Hygiene"; also the regulations regarding the sanitation of garrisons, quarters, hospitals, etc., as well as of camps and hospitals in the field, and of transports, troop, and hospital ships. (*d*) Duties of medical officers at home, abroad, and at sea, as defined in regulations; also hospital organisation and administration in peace and war, in-

cluding the transport of sick and wounded by land and sea. (e) The administration, interior economy, command, and discipline of the Medical Staff Corps, together with a knowledge of the principles of military law and their practical application (a certificate of proficiency in military law obtained at a garrison class will exempt the holder from examination in the latter).

3. A certificate will be required from a recognised teacher of surgery in any medical school, at home or abroad, in which operative surgery is taught, showing that the medical officer has gone satisfactorily through a complete course of operative surgery during the period within which the examination must be taken, and that he is a competent operator.

4. A report on any subject of a practical professional character, to be selected by the officer himself, and certified to be his own composition and in his own handwriting, will also be required. Considerable importance will be attached to the literary and scientific merits of this report, which must be furnished before the officer completes twelve years' service.

5. The examinations will be conducted by printed questions, which will enter so far into the subject-matter of each head selected for examination as to show that the officer's knowledge has been fully tested.

6. The questions and answers will be forwarded, under a sealed confidential cover, to the Director-General of the Army Medical Department, for transmission to the examiners, who will report to the Director-General as to the competence of the officer examined.

INDIAN MEDICAL SERVICE.

The regulations for the examination of candidates for admission to Her Majesty's Indian Medical Service differ only slightly from those of the home service. The declarations are sent to the Military Secretary, India Office, Westminster.

The physical fitness of each candidate will be determined previous to examination by a board of medical officers, who are required to certify that his vision is sufficiently good to enable him to perform any surgical operation without the aid of glasses. Further particulars as to the standard of eyesight will be found in a pamphlet by Sir J. Fayrer, M.D., K.C.S.I., entitled "Regulations as to Defects of Vision," published by Messrs. J. & A. Churchill, 7 Great Marlborough Street, W. A moderate degree of myopia will not be considered a disqualification, provided it does not necessitate the use of glasses during the performance of operations, and that no organic disease of the eyes exists. Every candidate must also be free from all other organic disease, and from constitutional weakness, or other disability likely to unfit him for military service in India. Candidates who pass the Medical Board Examination will be required to pay a fee of £1 before being permitted to compete.

Hindustani is included among the voluntary subjects, and candidates presenting themselves for examination in it are recommended to study some recognised text-book, such as the annotated edition of the "Taubut-un-Nasuk," which is the text used by candidates for the Indian Civil Service.

Course at Netley.—These courses will be of not less than four months' duration; but candidates who have already gone through a course at Netley, as candidates for the Army Medical Service, may, if thought desirable, be exempted from attending the School a second time.

At the conclusion of the course at Netley, and after the leaving examination, the position of the candidates on the lists of surgeon-lieutenants will be determined by the combined results of the Preliminary and Final Examinations, and, so far as the requirements of the service will permit, they will have the choice of commands in India (*i.e.* Bengal, Punjab, Madras, or Bombay) according to their position in that list.

Officers appointed to the Indian Medical Service will be placed on one list. Though ordinarily employed within the limits of the command to which they may have been posted, they will be liable to employment in any part of India, according to the exigencies of the service.

No candidate will be permitted to compete more than three times.

Examinations for admission to the service usually take place twice in the year, *i.e.* in February and August.

The examiners in London will prepare a list in order of merit, with the marks affixed in the different subjects, to be transmitted to the Director-General and communicated to the professors of the Army Medical School. If any candidate is found to be deficient in any particular subject, this shall be stated, in order that he may receive special instruction on the point at Netley.

PAY AND ALLOWANCE.

The following are the rates of "Indian pay and allowances" which will be drawn by officers hereafter appointed to the Indian Medical Service:—

Rank.	Years' Service.	Indian Pay and Allowances per mensem. When not holding an appointment carrying higher pay.		
		R.	A.	P.
Brigade-surgeon-lieutenant-colonel	25 and over	900	0	0
Surgeon-lieutenant-colonel .	,,	888	12	0
Surgeon-lieutenant-colonel .	20 ,,	852	3	7
Surgeon-major . . .	15 ,,	677	6	11
,, ...	12 ,,	640	14	6

Rank.	Years' Service.	*A.* When not receiving any Staff Allowance.			*B.* When receiving Staff Allowance in addition.		
		R.	A.	P.	R.	A.	P.
Surgeon-captain	10 and over	500	0	0	450	0	0
,, ,,	5 ,,	450	0	0	400	0	0
Surgeon-captain and surgeon-lieutenant	under 5	350	0	0	300	0	0

On first appointment they will only come into receipt of "Indian pay and allowances" (Column *A*) from the date of their arrival in India.

Officers holding the principal administrative appointments and substantive military charges of the Indian Medical Service receive at present the following consolidated salaries:—

		Rs. per mensem.	
Surgeon-major-general,	Bengal	2700	
,,	Madras	2500	
,,	Bombay	2200	
Surgeon-colonel	from	1800	
	to	2250	
Brigade-surgeon-lieutenant-colonel of twenty years service and upwards		1100	with Rs. 90 horse allowance in cavalry regiments.
Surgeon-lieutenant-colonel, in substantive charge of a native regiment		1000	with Rs. 90 do.
Surgeon-major under twenty years' service in substantive charge of a native regiment		800	with Rs. 90 do.
Surgeon-captain above five years' full pay service in substantive charge of a native regiment		600	with Rs. 60 do.
Surgeon-captain or surgeon-lieutenant under five years' do. in substantive charge of a native regiment		450	with Rs. 60 do.

The salaries of other substantive medical appointments in the civil and military departments are consolidated, and vary from Rs. 1800 to Rs. 400 per mensem.

LEAVE RULES.

Officers of the Indian Medical Service, below the rank of surgeon-colonel, may be granted—(1) Privilege leave, under such regulations as may from time to time be in force; (2) leave out of India, for no longer period than one year, capable of extension to two years' absence from duty, on the following pay:—

After arrival in India, on first appointment				£200 a year.
After the commencement of the 5th year's service for pension				250 ,,
Do.	do.	10th	do.	300 ,,
Do.	do.	15th	do.	400 ,,
Do.	do.	20th	do.	450 ,,
Do.	do.	25th	do.	500 ,,

(3) Leave in India, but for the period of one year only, on full military pay and half the staff salary of appointment.

RETIRING PENSIONS AND HALF-PAY.

Officers of the Indian Medical Service will be allowed to retire on the following scale of pension, on completion of the required periods of service :—

After 30 years' service for pension	£700 per annum.
,, 25 ,, ,, ...	500 ,,
,, 20 ,, ,, ...	365 ,,
,, 17 ,, ,, ...	292 ,,

Officers not entitled to pension, when placed on temporary or permanent half-pay, will be granted the British rate of half-pay of their military rank as under :—

Rank.	Rates of Half-pay. Per diem.		Per annum.		
	s.	d.	£	s.	d.
Brigade-surgeon-lieutenant-colonel Surgeon-lieutenant-colonel	11	0	200	15	0
Surgeon-major	9	6	173	7	6
Surgeon-captain	7	0	127	15	0
Surgeon-lieutenant	3	0	54	15	0

Officers cannot retire *in India* on half-pay (No. 45, 28th February 1865).

NAVY MEDICAL DEPARTMENT.

The regulations for this service correspond very closely to those for the army, with the following exceptions :—

The candidate must also declare his readiness to engage for general service at home or abroad as required.

The official requirements in the natural sciences are as follows :—

Zoology.—The examination in zoology will include the general principles of biology and a comparison of animals with plants; the distinctive characters of the larger group of animals—the protozoa, cœlenterata, vermes, arthropoda, mollusca, echinodermata, and vertebrata—as illustrated by common types; the elements of embryology; animal parasites.

Botany.—The general principles of the morphology and physiology of low forms of life, for example, torula, bacteria, spirogyra, moss, fern; the general morphology of flowering plants; diagnosis of the important British natural orders; medicinal plants.

Physics.—The general principles of mathematics, acoustics, optics, heat, magnetism, and electricity, as: the properties of solids, liquids, and gases; conservation of energy, specific gravity, propagation and reflection of sound and light, temperature, specific and latent heat, thermometers, properties of mirrors and lenses, chromatic dispersion of light, forms of batteries, galvanic and frictional electricity, general properties of magnets.

Physical geography.—The relation of the earth to the rest of the solar system, nature of the earth's crust; the chief kinds of rocks, general configuration of land and water, mountains, plains, lakes, rivers, islands, glaciers and icebergs, the ocean currents, tides, the earth's atmosphere, winds and storms, dew, rain, climate, volcanoes, earthquakes, general distribution of animal and vegetable life.

Successful candidates, immediately after passing the examination, will receive commissions as surgeons in the Royal Navy, and will undergo a course of practical instruction in naval hygiene, etc., at Haslar Hospital.

Pay and Rank.

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—on entry	0	11	6	209	17	6
,, after 4 years' full-pay service	0	13	6	246	7	6
,, ,, 8 ,, ,,	0	15	6	282	17	6
Staff-surgeon—on promotion	1	1	0	383	5	0
,, after 4 years' full-pay service in rank	1	4	0	438	0	0
Fleet-surgeon—on promotion	1	7	0	492	15	0
,, after 4 years' full-pay service in rank	1	10	0	547	10	0
,, ,, 8 ,, ,,	1	13	0	602	5	0
Deputy inspector-general	2	2	0	766	10	0
Inspector-general	2	15	0	1,003	15	0

On first appointment to the service, medical officers will receive full pay from date of appointment, but subject to the provisions of Art. 1342, Clause 2, of the Queen's Regulations, 1893.

The allowance of 5s. a day, in addition to full pay, at present granted to the fleet-surgeon of a flag ship, bearing the flag of a commander-in-chief on a foreign station, will be given to the senior medical officer, being a fleet- or staff-surgeon, and an allowance of 2s. 6d. a day to the senior medical officer, being a fleet- or staff-surgeon, of the ship of a commodore, or of a senior officer commanding a foreign station.

Medical officers conducting the course of instruction at Haslar Hospital will receive the following allowances:—

The senior officer employed upon this duty	£150 a year.
The junior officer assisting	50 a year.

The hospital allowances for naval medical officers at home and abroad, in lieu of provisions for themselves and servants, and for fuel and light, are as follow:—

	At Home.	Abroad.
Inspectors-general of hospitals	£85	£130
Deputy inspectors-general	67	112
Fleet-surgeons and staff-surgeons	53	112
Surgeons	39	108

Medical officers serving afloat receive an allowance of 1s. 6d. a day in lieu of provisions, fuel and lights, as laid down in the Queen's Regulations. The travelling allowances, extra pay, lodging money, and compensation for losses, are fixed for naval medical officers according to their relative rank in the service.

Half-Pay.

The undermentioned scale of half-pay is substituted for that hitherto in force:—

Rank.	Daily.			Yearly.		
	£	s.	d.	£	s.	d.
Surgeon—under 2 years' full-pay service	0	6	0	109	10	0
,, after 2 years' full-pay service	0	7	0	127	15	0
,, ,, 4 ,, ,,	0	8	0	146	0	0
,, ,, 6 ,, ,,	0	9	0	164	5	0
,, ,, 8 ,, ,,	0	10	0	182	10	0
,, ,, 10 ,, ,,	0	11	0	200	15	0
Staff-surgeon—on promotion	0	12	0	219	0	0
,, after 2 years' full-pay service in rank	0	13	0	237	5	0
,, ,, 4 ,, ,,	0	14	0	255	10	0
,, ,, 6 ,, ,,	0	15	0	273	15	0
Fleet-surgeon—on promotion	0	17	0	310	5	0
,, after 2 years' full-pay service in rank	0	18	0	328	10	0
,, ,, 4 ,, ,,	0	19	0	346	15	0
,, ,, 6 ,, ,,	1	0	0	365	0	0
Deputy inspector-general—on promotion	1	5	0	456	5	0
,, after 2 years' full-pay service in rank	1	7	0	492	15	0
,, ,, 4 ,, ,,	1	9	0	529	5	0
Inspector-general	1	18	0	693	10	0

PRISON MEDICAL SERVICE.

This branch presents limited opportunities, either for entrance, or for subsequent advancement. The smaller prisons are officered, as a rule, by local practitioners. The medical officers to the larger prisons are appointed by the Convict Prison Board, or the Prison Commission. Special forms may be obtained from the secretary of the latter at the Home Office, on which applications are to be made. In the Convict Service there are eight posts, with salaries ranging from £250 to £550; in the Local Prison Service twenty-eight officers, with salaries from £250 to £500.

COLONIAL SERVICES.

Applicants for posts under the Colonial Office must be between the ages of 23 and 30, be doubly qualified, and preferably have held hospital appointments. The usual certificates require to be shown, and an official medical examination undergone. Applications for posts or for information are to be sent to the assistant-secretary, Colonial Office. As a rule, about twelve to fifteen vacancies occur annually. In addition to these, a number of semi-official appointments are made yearly by this office, in connection with public works, etc., in the Colonies.

PRACTITIONERS ABROAD.

In the majority of the British Colonies local registration of legal British qualification suffices to allow a practitioner to pursue the duties of his profession. Only in two (cf. Table VII.)

is this unnecessary; while in one, Ontario, a local diploma must be gained after examination.

Few of the foreign nations allow British registered practitioners to practise, unless they first pass the State examinations. Table VII. gives a tabular view of the different regulations current:—

TABLE VII. COLONIES AND COUNTRIES IN WHICH DULY REGISTERED BRITISH GRADUATES AND DIPLOMATES CAN PRACTISE.

1. WITHOUT COMPULSORY LOCAL REGISTRATION.

New South Wales, South Australia, Italy (only among visitors and aliens).

2. (*a*) AFTER LOCAL REGISTRATION.

Victoria, Tasmania, Queensland, New Zealand (£1, 5s. fee); Western Australia, Natal[1] (£1, 1s. to £3, 3s.); Cape Colony (£5 fee); Prince Edward Island ($20); New Brunswick ($1 to $2 a year); Nova Scotia, Quebec, Manitoba, North-West Territories ($50, and $1 to $2 a year); British Columbia, Jamaica, Klondyke ($50 fee); British Guiana, Fiji, Gold Coast, Gibraltar, Leeward and Virgin Islands, Monaco.

(*b*) AFTER APPLICATION FOR PERMISSION.

Belgium, Greece (examination in French or English); Italy.

3. ONLY AFTER EXAMINATION.

State examination.—Austria, Denmark, Holland, Germany, Greece, Portugal, Roumania (*vivâ voce*), Russia, Norway, Spain, Sweden, Switzerland, Brazil (in French or Portuguese).

University or local examinations.—France, Turkey (£4, 10s. fee); Argentine (in Spanish); Chili (*vivâ voce*); Peru (*vivâ voce*); Uruguay (*vivâ voce*); Ontario.

4. AMERICA.

Twenty-four States require the passage of an examination; seventeen States require the same, or approval of the diploma presented by the applicant; and in nine, presentation of the diploma or degree is sufficient. The last nine are—

Alaska Territory, District of Columbia, Michigan, Arkansas, Kansas, Ohio, Arizona Territory, Nevada, Wyoming.

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[1] Annual licence also of £5.

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